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Published by THE PENTON PUBLISHING CO.,
Penton Bldg., Cleveland 13, Ohio, E. L. SHANER,
President and Treasurer; G. O. HAYS, Vice
President and General Manager; R. C. JAENKE,
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Member, Audit Bureau of Circulations; Associated
Business Papers Inc., and National Publishers'
Association.

Published every Monday. Subscription in the
United States and possessions, Canada, Mexico,
Cuba, Central and South America, one year \$6;
two years \$10; all other countries, one year
\$12. Single copies (current issues) 25c. Entered
as second class matter at the postoffice at
Cleveland, under the Act of March 3, 1879.
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Business Staff on Page 4



STEEL

The Magazine of Metalworking and Metalproducing

VOL. 119, NO. 9

AUGUST 26, 1946

NEWS

Lake Strike Cuts Ore Shipments 10%; Chrysler Union To Reopen Contract	43
Limitation on Use of Pig Iron for Housing Items Recommended	45
Foreign Steel Interests Inquiring for Rolling Mill Equipment Here	46
Steel Advisory Group Authorized To Collect Data for Price Increase	47
Institute Reports Capacity, Production, Shipments for June	47
Refrigerator Production Rising	48
Additional Plants May Be Made Available for Multiple Tenancy	49
Machine Tool Builders Note Decline in New Buying Interest	50
British Steel Nationalization Believed Unlikely Before 1948	56
Belgium Increases Output Despite Strikes; Coal Supply Improves	57
New Crossing for San Francisco Bay Proposed	62
Sheffield Steel Seeks To Buy Government-Owned Plant at Houston	63
Foreign Trade Outlook Good, Executive Says	64

TECHNICAL

Hardenability Testing in Material Control	72
Stamping Machine Parts Reduces Costs and Increases Production	74
Selective Carburizing by the "Mill Scale" Method	76
Seen and Heard in the Machinery Field	77
Heat Treatment and Metallurgy of Aluminum Alloys—Part II	78
Applications of Lime Ferritic Electrodes	80
Engineering News at a Glance	88
Hot-Dip Galvanizing Practice—Part II	100
Handling Bar Stock by Mechanized Equipment Saves Manpower	108

FEATURES

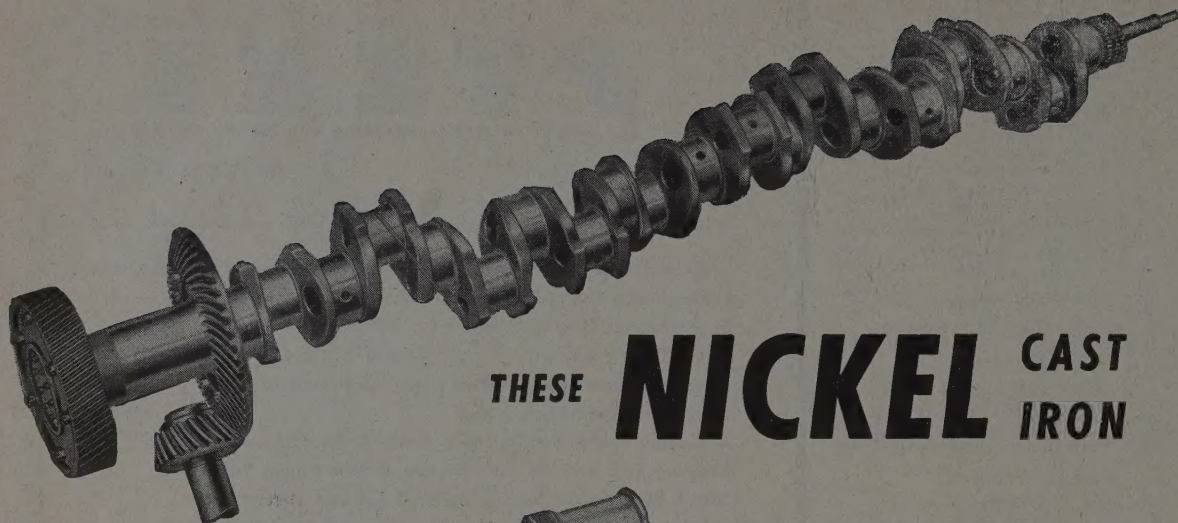
As the Editor Views the News	39	Men of Industry	66
Present, Past and Pending	45	Obituaries	71
Windows of Washington	52	Industrial Equipment	112
Mirrors of Motordom	59	The Business Trend	132
Activities	64	Construction and Enterprise	158

MARKETS

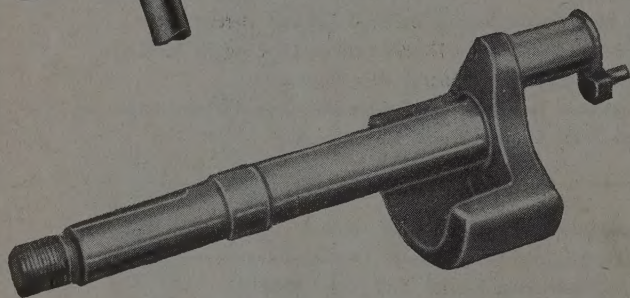
Steel Supply to Consumers Better Despite Shortages	137
Market Prices and Composites	138
Index to Advertisers	168

NEXT WEEK...

Methods of Controlling Distortion in Welded Structures
Economic Aspects of Tube Bending
Thread Ring Gage with Long Life
Effects of Grain-Growth Inhibitors in Fine-Grained Steels
Drying Stopper Rods in Recirculating Oven



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Try the Obvious

VIEWS

the NEWS

With the demand for rolled steel and castings exceeding supply by a substantial margin, it is ridiculous that steel mills and foundries should be confronted with so much difficulty in obtaining adequate supplies of ferrous scrap.

This statement does not imply that the scrap problem is a simple one. It is complicated by numerous factors, not the least of which is that scrap that can be collected and marketed easily really is scarce. However, there is scrap to be had and it would seem that now is the time for everybody concerned with scrap to ask himself whether or not every reasonable effort to bring it to market has been exhausted.

If one approaches the problem from this angle, he immediately runs into the price factor. Scrap drives have been held. Industry has poured money into committee work to stimulate scrap collections. Government agencies have devoted lavish attention to the problem. But nothing has been done to ascertain what the incentive of higher scrap prices will do.

OPA ceilings on scrap were imposed early in April, 1941. Non-railroad heavy melting steel at Pittsburgh was frozen at \$20 per ton. At that time Old Range bessemer iron ore was pegged at \$4.75; basic pig iron at Neville Island \$23.50; coke, delivered Buffalo or Cleveland, \$11.75; steel bars, Pittsburgh, 2.15c; and shapes, plates and hot rolled sheets, Pittsburgh, 2.10c. Today the comparable ore price is \$5.45, that of pig iron \$28, coke \$14.55 and \$14.75, bars 2.50c, shapes 2.35c, plates 2.50c and sheets 2.425c. In short, from early 1941 until now, the prices of ore, coke and pig iron—essential ingredients of steel—have advanced substantially under government sanction. Likewise, prices of finished steel have advanced moderately.

Meanwhile, nonrailroad heavy melting steel, Pittsburgh, remains unchanged at \$20. Not only that, but as recently as early this month OPA declared that current ceiling prices for iron and steel scrap "are adequate and no increase will be granted in the foreseeable future."

Isn't this a bit silly? Doesn't it indicate that OPA is motivated by prejudice or obstinacy? On what grounds can OPA deny a slight increase in scrap in view of increases granted on all other materials entering into the production of rolled steel and castings?

Now that all other remedies have been exhausted, why not try the obvious one of price incentive? After all, do steelmakers and foundrymen want further demonstrations of the academic technic of OPA controls or do they want usable scrap?

STEEL

August 26, 1946

AN AMERICAN ASSET: Three entirely independent items in this issue point to an asset of American industry that often is overlooked or underrated. The new president of Westinghouse Electric International Co. says that after competition sets in, our "know how" on production will be in great demand throughout the world. The second item is Machine Tool Editor Guy Hubbard's discussion of the great expansion of specialized technical talent to be found in modern engineering departments of manufacturing establishments. The third is the description of numerous inquiries received

by American iron and steel mill equipment builders from foreign countries.

These three indications point to the fact that since World War I, industry in the United States has made great progress not only in the development of more efficient production processes, but also in the wide dissemination of "know how" throughout large and small plants all over the country. Time was when railroads were reluctant to use alloy steels because they felt they were too "tricky" to be handled by blacksmiths in remote back shops and roundhouses. Today the ability to handle

(OVER)

steels and other materials of intricate analysis or composition is almost uniformly distributed geographically.

This is a tribute to the free interchange of ideas that prevails to a greater extent in America than in any other industrial nation. It is an advantage to be prized and nourished. —pp. 46, 64, 77

. . .

RESPECTS CONTRACT: No matter how the present strike on the Great Lakes turns out, one thing already has happened that is distinctly encouraging.

The CIO National Maritime Union, which has contracts with only a few of the ship operators on the lakes, has attempted to halt all lake freight traffic. It appealed to other unions to assist it in this objective. Some of the strongest unions around the lakes have been reluctant to lend aid to the strike and the members of CIO steelmakers unions actually have helped unload cargoes—an act which certainly lends no assistance to the striking seamen.

To CIO-NMU protests against this action, the head of a CIO steelworkers' union replied that his union was prepared to go along with NMU up to a reasonable point, but that it would not go along to the extent of breaking its own contracts with steel companies. This is one gratifying incident where a union has acknowledged the validity of its agreement with the employers of its members. —p. 43

. . .

MORE REALISTIC GOAL: In his pre-election speech of last Feb. 9, Joseph Stalin announced three or more "five-year plans" which would increase the annual production of pig iron and steel ingots in Russia to 50 million and 60 million tons, respectively. It was inferred that this goal might be reached sometime in the sixties. Steelmakers throughout the world considered this as an ambitious but not impossible long-range program.

Now the Soviet News reports that the Soviet objective for 1950 is the production of 19.5 million tons of pig iron and 25.4 million tons of steel ingots. This is a modest target compared with that proposed by the Soviet leader in February. In fact, the announced goals for 1950 are only 14 per cent higher in the case of pig iron and 16 per cent higher in the case of steel ingots than actual production in 1940—Russia's last prewar year. —p. 57

SIGNS OF THE TIMES: Britain's labor government, committed to the nationalization of the British iron and steel industry, may present a bill to Parliament which would put nationalization into effect in the latter part of 1947. This move will be protested vigorously (p. 56) and even if nationalization is approved by Parliament, the actual transfer of properties from private ownership cannot be completed before the middle of 1948. . . . The millionth passenger car and the 500,000th truck built since Jan. 1 (p. 59) rolled off assembly lines last Monday. Even with assemblies mounting, it is doubtful whether total production of passenger cars and trucks in 1946 can exceed 3,500,000. . . . Californians are talking seriously about another transportation link across San Francisco bay. It will be either a bridge (p. 62) or a causeway with an opening for the passage of ships. Either plan will involve an expenditure of \$100 million or more and will require a substantial tonnage of steel. . . . As if to corroborate other indicators of industrial activity (p. 132), electric power output in the week ended Aug. 17 touched a new postwar high of 4,422 million kilowatt hours. . . . Delay in proceeding with the \$20 million research center announced by General Motors last year (p. 60) is attributed to sharply increased building costs. However, organization of personnel for the project continues. . . . William E. Knox, new president of Westinghouse Electric International Co., which has 213 distributors in 89 foreign countries (p. 64), believes this nation's booming foreign trade will continue from three to five years. In his opinion, American "know how" is our chief exportable product. . . . An interesting case study on one company's experience with hardenability testing in material control (p. 72) should be highly informative to other manufacturers contemplating this procedure in connection with the use of standard and alloy steels. . . . In spite of numerous local difficulties, coupled with increasing competition from other nations, Belgian and Luxembourgian iron and steel producers (p. 57) are making encouraging progress in their resumption of foreign trade. . . . Inquiries for iron and steel mill equipment received by American builders from foreign countries—chiefly the United Kingdom, France, Belgium, Italy, Sweden, Chile and Canada (p. 46)—run to a total that would increase foreign finishing capacity about 15 million tons annually. These inquiries are superimposed upon heavy bookings for domestic account.

E. L. Shaner

EDITOR-IN-CHIEF



Picket lines established by the National Maritime Union at lake ports were only partially successful in slowing the flow of lake commerce. Both United Steelworkers and AFL-Longshoremen refused to honor the strike at terminals. NEA photo

Lake Strike Cuts Ore Shipments 10%; Chrysler Union To Reopen Contract

Shippers, industry watch situation anxiously. Full operation necessary to provide adequate stocks for winter

CLEVELAND

GREAT LAKES shipments of iron ore and coal were affected only slightly by the first week of the attempt by the National Maritime Union-CIO to tie up lake shipping. The NMU apparently was failing to win the support of other unions necessary to make the strike a success and at week's end only about 15 per cent of the ore, coal and grain fleet was immobilized.

Slightly more than 2,200,000 tons of iron ore were moved down the lakes in the first week of the strike; this is within about 10 per cent of normal.

Lake Erie coal shipping docks loaded 1,847,000 tons of bituminous coal into lake freighters for cargo and vessel fuel; this is considered a heavy loading week and is only slightly below the alltime record loading.

In addition to about two score bulk

carriers immobilized, the strike has laid up about 40 tankers and package freighters, seriously affecting oil deliveries to lake ports and interrupting water delivery of new automobiles and general freight.

The NMU represents only a small fraction of the seamen manning Great Lakes vessels and has contracts with only a few of the shipping companies. Apparent strategy of attempting a strike in the face of its small representation on the lakes was to win support of other unions at loading and unloading terminals and possibly effect a tieup serious enough to permit the federal government to seize the shipping industry.

However, this strategy appeared doomed to failure when the United Steelworkers balked at violating their contracts by refusing to unload ships tied up at steel docks. The steelworkers' position was stated bluntly by William F. Donovan, Cleveland district director, as he said: "The Maritime Union has our full support up to the point where we would

(Please turn to Page 44)

Top CIO officials fail to sell union locals on 6-month moratorium on strike threats and wage increase demands

DETROIT

STRATEGY of Philip Murray and other CIO leaders in attempting to sell their membership on a six-month moratorium on strike threats and increased wage demands in favor of exerting consumer pressure on rising prices continues to backfire. After the failure of a Washington conference to agree on a policy, another explosion came last week with announcement by the Chrysler local of the UAW-CIO that it would reopen contract negotiations Oct. 18 for higher wages to meet increased living costs. On another front the Ford local of the automobile workers is making inflammatory demands on international officers to start negotiating with Ford for what it calls a "cost-of-living bonus."

Terms of the Chrysler contract provide that it may be reopened no earlier than

Oct. 16, in contrast with other automotive union contracts which have been frozen until next year on the question of wages. The Chrysler local has not indicated what increase it will ask for two months hence, but says this will depend on the trend in living costs. The move is calculated in some quarters as simply additional pressure on the government to restore and enforce price controls on basic commodities, since there is grave doubt that a strike of Chrysler workers would win much support after the general 18½-cent increase granted them earlier this year.

The Ford local is seeking to get around contract provisions freezing wages until next spring by the "cost of living bonus". Such a bonus would be computed on the basis of increased living costs since Jan. 5, would be retroactive to the date the 18-cent increase was granted and would be on a monthly basis. Thus, as described by the union local, if the cost of living should rise 10 per cent in the month of September, every worker would receive 10 per cent more for every hour worked in that month, the money to be paid him in his first pay in the month following.

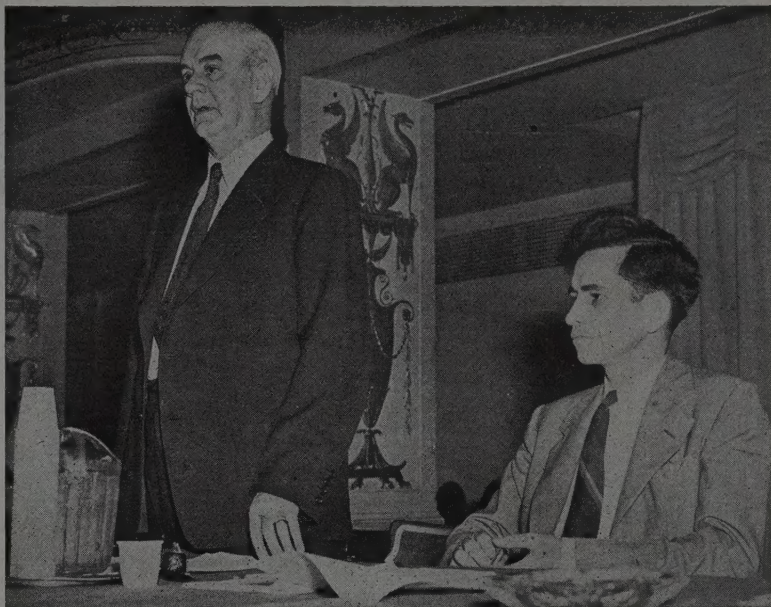
International officers of the UAW probably will exert every effort to avoid letting these ridiculous Ford demands come to a head. Whether they will be successful or not remains to be seen, if the action of the Chrysler local is any indication, they will not, since a militant local can readily take the play away from international officers who then are faced with the necessity of "authorizing" local actions.

Government Requests Lewis And Mine Owners To Meet

Seeking to return operation of more than 3000 mines to their owners, the federal government has invited John L. Lewis, president of the United Mine Workers-AFL, and soft coal operators to meet Sept. 10 to negotiate a contract under which the miners would work for the owners.

The government took over the mines May 22 after Mr. Lewis and the operators failed to work out a new contract following a 59-day strike. Since then, the miners have been digging coal under an agreement with J. A. Krug, secretary of the interior, which incorporates a large portion of the UMW demands.

Later, a further concession was made when Admiral Ben Moreell, federal coal mines administrator, agreed to recognize a union of foremen in coal mines of Jones & Laughlin Steel Corp. The operators have lost two attempts to block this action and the issue is now



Philip Murray's attempt to sell CIO membership on a 6-month moratorium on strike threats and wage increase demands at an emergency meeting in Washington was only partially successful. Even while he addressed the union membership, the CIO Maritime Union was attempting to tie up Great Lakes commerce and the United Automobile Workers were agitating for new wage negotiations.

Photo shows Mr. Murray; seated is James B. Carey, CIO secretary-treasurer

scheduled for a federal court hearing "on its merits"—that is, as to whether the National Labor Relations Act contemplated that foremen should be unionized with the men to whom they give orders.

Great Lakes Strike Cuts Ore Shipments 10 Per Cent

(Concluded from Page 43)

be forced to violate our contracts, but beyond that we cannot go." Donovan's statement followed a complaint by NMU officials to CIO President Philip Murray that the steelworkers are "hurting our cause" by unloading ships.

International Longshoremen's Association-AFL openly opposed the NMU strike and its leaders charged the NMU is "communistically controlled" and is trying to destroy the AFL. The AFL longshoremen continue to unload ships and ignore NMU picket lines.

The interruption to lake shipping appeared too trivial in its first week to justify intervention by the government.

Ship operators and the steel industry, however, were keeping an anxious eye on developments as it was frankly recognized that a shift in developments could easily precipitate a crisis.

Lake shipping got a late start this year due to strikes in the coal fields,

the iron ore mines and the threatened railroad tieup and full operation to the end of the season is necessary to insure an adequate supply of iron ore.

Present schedules call for 61,500,000 tons of ore to be moved down the lakes this season. Shipments to Aug. 1 amounted to only 23,848,385, or 16,500,000 tons less than moved during the same period in 1945. If the season's goal is to be reached, 37,691,161 tons of ore must be shipped during the remainder of the season.

Taking into account that there are fewer ships available for the ore trade this year than last, and that great pressure exists for increased shipments of coal, the industry doubts that the fleet can average 10 million tons a month during August, September and October. Even if this is possible, it will leave more than 7,500,000 tons to be moved in November, which approximately equals the record tonnage to be moved in that month during the last eight years. Early freezing conditions could materially affect the November shipments.

Should the strike on the lakes seriously interrupt the ore shipments a shortage of ore next spring is likely, which in turn would affect steelmaking operations, increase the already severe pinch in steel supply to metalworking companies, and possibly cause another slowdown all along the industrial front.

Limitation on Use of Pig Iron For Housing Items Recommended

Malleable Iron Industry committee urges that Civilian Production Administration restrict pig iron allocations for housing to 25 per cent of foundry pig iron production in any one month or quarter of year

RECOMMENDATION that the Civilian Production Administration limit pig iron allocations for manufacture of housing items to 25 per cent of foundry pig iron production in any one month or quarter of year was made last week by the Malleable Iron Industry Advisory Committee at a meeting in Washington.

Many plants will be shut down in the fourth quarter if allocations of pig iron for housing items maintain the September rate, the committee warned.

John C. Houston Jr., deputy Civilian Production administrator, told the committee that it had been necessary to reduce August pig iron allocations for housing items to prevent a too serious impact on other industries. However, he expressed hope of increased pig iron output in the fourth quarter which he said would ease the very tight situation on malleable iron castings for producers of nonhousing articles and also permit full production of critical housing items.

Prior to reduction of August pig iron allocations for housing items, approximately 55 per cent of pig iron shipments to foundries had been allotted for housing items, according to reports. After revision, the percentage is somewhere between 25 and 55 it is said. Mr. Houston said his agency is reviewing September pig iron allocations and expects them to be somewhat along lines of the revised August allocations. No final decision regarding fourth quarter allocations will be made, he said, until he has more complete supply data.

Fourth quarter shipments of pig iron to foundries may be around 375,000 tons a month, but this is only approximate inasmuch as some furnaces may be down for relining that was postponed during the war. Also, low quality coke as a result of the coal strike is hampering production, it was reported.

The Malleable Iron committee reviewed the Office of Price Administration decision against a pig iron price increase now beyond the recent \$2 raise. The committee was told that the government is studying the possibility of subsidizing pig iron production by marginal operation furnaces and the absorbing through subsidies of high freight rates in order to make it economically feasible to move pig iron more freely. The

committee suggested both a price increase in pig iron and a subsidy. Recommended also was an immediate price increase on scrap.

Two further recommendations by the committee were that CPA study minimum metallurgical requirements of pig iron in the mixtures of various ferrous castings, looking to limitation on pig iron content in such mixes where this would preclude wasteful practices, and that the National Housing Agency act speedily on the committee's July recommendation to bar the use of cast iron soil pipe where some other material would serve the purpose.

WAA Seeks Operators for Government Blast Furnaces

Ten of the blast furnaces built by the government during the war period to increase pig iron supply and offset scrap shortages are in current production and

the Office of Real Property Disposal, War Assets Administration, is attempting to secure operators for ten other government-owned furnaces that are susceptible to early production.

The ten furnaces in operation, having a combined capacity of 3,759,668 net tons of pig iron per year, are: Two at Braddock, Pa.; two at Granite City, Ill.; two at Geneva, Utah; and one each at Cleveland, Chicago, Duluth, and Youngstown, O.

The remaining ten blast furnaces, having a total annual capacity of 3,077,184 net tons of pig iron, which are not in operation are: Two furnaces, one not fully completed, having a total capacity of 854,000 net tons, located at Indiana Harbor, Ind., now under lease to Inland Steel Co.; one furnace of 399,850 net tons capacity at Daingerfield, Tex., under lease to Lone Star Steel Co.; one furnace of 274,000 net tons capacity at Houston, Tex., adjoining the plant of Sheffield Steel Corp.; one furnace of 280,000 net tons capacity at Gadsden, Ala., adjoining the plant of Republic Steel Corp.; one furnace of 383,334 tons at the Geneva Steel plant, Geneva, Utah; one furnace of Columbia Steel Co.; the incomplete furnace of 432,000 net tons capacity at Monessen, Pa., adjoining the plant of the Pittsburgh Steel Co.; the furnace of 127,000 net tons capacity at Chester, Pa., and the incomplete iron furnace at Rusk, Tex.

Present, Past and Pending

■ FABRICATED STRUCTURAL STEEL BOOKINGS INCREASE

NEW YORK—Estimated bookings of fabricated structural steel increased 2029 tons in July to 133,039, making the seven months total 1,100,405 tons, or 30 per cent above the average for the same periods in 1936-40. July shipments increased slightly to 130,980 tons while the tonnage available for fabrication within the next four months increased to 673,839 tons, American Institute of Steel Construction reported last week.

■ NATIONAL CAN ACQUIRES UNION PLATE & WIRE CO.

NEW YORK—National Can Corp. has purchased the entire capital stock of Union Plate & Wire Co., Attleboro, Mass., platers of precious metals. The company will be operated as a subsidiary of National Can.

■ RFC COPPER AND LEAD STOCKPILES DECLINE

WASHINGTON—RFC stockpiles of principal metals being drawn on by CPA for civilian purposes included the following at the end of July: Copper, 264,849 short tons and lead, 33,751 short tons, representing declines for the month; zinc, 543,434 short tons, tin, 54,220 long tons, representing increases.

■ \$15 MILLION ELECTRICAL FIRM ORGANIZED IN MEXICO

PITTSBURGH—Industrial Electrica de Mexico, S. A., a \$15 million company for production near Mexico City of electrical equipment, has been organized by Westinghouse Electric Corp. Limited production under long-term license agreement will begin by the end of this year and will be augmented by use of subassemblies furnished by Westinghouse until full scale operation is possible.

■ BRITAIN SEIZES GERMAN STEEL INDUSTRY IN ITS ZONE

LONDON —(by cable)—British Control Commission has taken over the German iron and steel industry in the British occupation zone. The "nationalization" order had three official purposes: To reduce the industry's capacity to peacetime level; to break concentration of economic power; to prepare the industry for reorganization.

Foreign Steel Interests Inquiring For Rolling Mill Equipment Here

Proposed programs indicate expansion of 15 million tons in annual finishing capacity abroad. Foreign loans seen encouraging modernization. Equipment builders heavily booked with orders from domestic steel companies

PITTSBURGH

SUBSTANTIAL inquiries for steel mill equipment from foreign countries are being received by American builders and indicate proposed expansion programs totaling about 15 million tons of foreign finishing capacity annually.

The proposed expansion programs are believed prompted in most cases by loans from the United States to the foreign governments. Industry officials point out that very little steel rolling equipment in Europe was destroyed during the war and that contemplated modernization programs are not necessary to carry out rehabilitation. However, loans, actual or in prospect, have encouraged the foreign countries to launch improvement programs which will increase capacity and which may result in a major competitive factor for the domestic steel industry.

The foreign orders are expected to develop at a time when domestic equipment builders are booked ahead 12 to 17 months on a large number of installations for United States companies.

Largest foreign demand for steel rolling mill equipment is expected to develop from England. However, the program is being held up pending crystallization of the nationalization procedure in regard to

type of compensation for steel plant facilities when taken over by the government.

The English industry plans to spend about 165 million pounds for new blast furnaces, open hearths and finishing mill facilities. Active inquiries from United Kingdom, amounting to about \$30 million, include: A wide flange mill, to be located in northern England or Scotland; plus one hot mill and two cold-reduction mills in Wales. Total English steel expansion program eventually is expected to result in orders placed here amounting to well over \$30 million, including electrical equipment, machine tools, annealing furnaces, and a host of auxiliary steel mill items. Recent reports from London indicate that priority will be given to imports of special steel mill equipment.

Other foreign finishing mill expansion programs include the following: France, one or two hot and cold-reduction mills; Belgium, blooming mill and strip mill; Italy, one strip mill; Sweden, hot and cold-reduction sheet and strip mill; Chile, hot and cold-reduction sheet and strip mill; Canada, new hot mill recently put in operation and cold-reduction sheet and tin plate mill on order.

Extent to which the domestic steel in-

dustry is preparing itself for future markets is indicated by the large number of expansion programs under way, particularly in sheet, strip and tin plate finishing capacity. Currently, sheet and strip capacity is about 1 million net tons above the July, 1941, level, while by July 1 next an additional 2.5 million tons of new capacity will be added. Also under way are a large number of comparatively small installations and improvements aimed at achieving greater efficiency and speeding up production schedules. The new types of rolling mill equipment are expected to provide finer finishes for flat-rolled products.

Many Expansions Planned

The following list of expansion programs (not necessarily complete) gives an indication of the steel industry's finished steel modernization program. It will be noted that cold-reduction mill expansion is restricted to narrower widths. Apparently there is ample wide automotive sheet capacity.

A 4-high, 5-stand, 42-in. cold-reduction mill, will soon be in operation at Weirton Steel Co., Weirton, W. Va., built by United Engineering & Foundry Co., Pittsburgh.

By 1947, Jones & Laughlin Steel Corp., will have one of the fastest cold-reduction mills in operation at its Aliquippa Works. This will be a 42-in., 4-high, 5-stand tin mill built by Mesta Machine Co., Pittsburgh.

A long strike at Granite City Steel Co. has delayed installation of a 56-in., 4-high, 4-stand, cold-reduction mill, which was built by Mesta.

Cold-reduction mill for Great Lakes Steel Co., Detroit, should also be in operation soon.

Expansion at Bethlehem Steel Corp.'s Sparrows Point plant includes a new 68-in., 4-high, 10-stand hot strip mill, and rebuilding of the 56-in. cold-reduction mill.

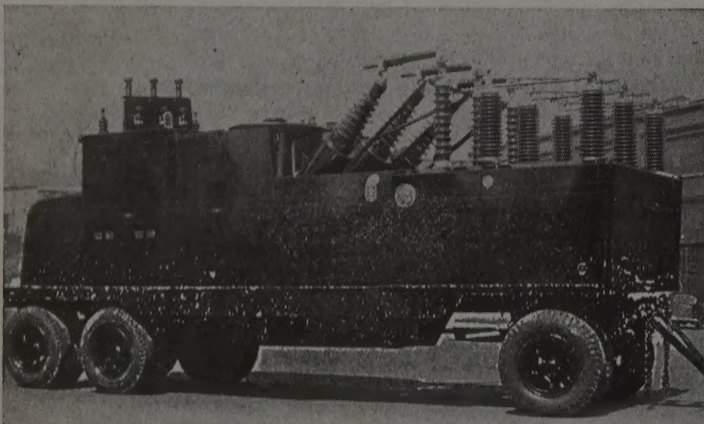
Republic Steel Corp. has a 48-in. hot strip mill under construction for its Youngstown plant.

Cold Metal Products Co., Youngstown, has launched an expansion program which will increase its capacity from four to six Steckel 4-high reversing cold-reduction mills, and make possible the production of light-gage, cold-rolled alloy and stainless strip as thin as .001.

Acme Steel Co., Chicago, has ordered a 22-in., 5-stand tandem cold-reduction mill from United Engineering.

Expansion at Allegheny-Ludlum Steel Corp.'s Leechburg, Pa., plant includes a 28-in., 4-stand, 4-high cold-reduction mill.

Columbia Steel Co., Pittsburg, Calif., has under construction a 54-in., 4-high, 5-stand cold-reduction mill by United En-



POWERHOUSE ON WHEELS: Product of General Electric Co., Schenectady, N. Y., this 2500-kva mobile unit substation is designed for use to relieve seasonal or temporary overloads, for emergency service and when rebuilding regular substations. The 22-ton unit measures 25 feet over-all and is 8 feet wide

engineering, which will produce 325,000 tons of sheets and tin plate annually; while production facilities will be installed at the Geneva, Utah, plant to supply Columbia Steel Co. with 386,000 tons of hot-rolled coils annually.

Carnegie-Illinois Steel Corp. recently awarded a contract to United Engineering for a 54-in., 4-high, 4-stand cold-reduction mill for installation at Gary, Ind.

Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., is reported to have under consideration a \$24 million expansion program, involving a cold-reduction mill for sheets and tin plate.

National Tube Co. has ordered from United Engineering for its Lorain, O., expansion program, a 46-in. blooming mill, 35-in. reversible bar mill, and 26 and 20-in. continuous billet mills. Aetna Standard Engineering Co., Youngstown, has booked a 36-in. piercer and continuous rolling mill, followed by two sizing mills for heavy and light wall tubing for National Tube Co.'s expansion program at Gary, Ind.; and 42-in. piercer and continuous rolling mill followed by two sizing mills for standard pipe, for company's Lorain, O., plant.

Steel Advisory Group Authorized To Collect Data for Price Increase

Reconversion officials hint across-the-board rise of \$1.50 a ton may be permitted under Barkley amendment. Taft amendment would have allowed about \$4 a ton. Some steel products may be decontrolled

DATA to support a petition for a steel price increase under the new price control law will be compiled by the OPA General Steel Products Industry Advisory Committee and submitted to the price control agency when the latter completes its procedural regulation under which industries will be permitted to ask price relief under the Barkley amendment.

OPA authorized the committee to go ahead with the collection of its data at a recent meeting. The committee last week had not formally requested an increase in prices.

OPA is permitted 60 days to make a decision after a petition for price relief

has been filed, indicating that price action is unlikely before late autumn.

Top reconversion officials are reported to believe that an across-the-board increase of \$1.50 a ton on steel products will be allowed under the Barkley amendment. They estimate that under the defeated Taft amendment, the allowable increase would have averaged \$4 a ton.

The committee also discussed with OPA officials the decontrol of some steel products, but action on decontrol is being held up pending completion of decontrol regulations. Items which may be decontrolled are those which are in fairly plentiful supply.

Institute Reports Capacity, Production, Shipments for June

Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month				To Date This Year			
				Production		Shipments (Net Tons)		Production		Shipments (Net Tons)	
				Net Tons	Per cent of capacity	Total	To members of the industry for conversion into further finished products	Net Tons	Per cent of capacity	Total	To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	40	1	XXXX	XXXX	XXX	251,664	98,860	XXXX	XXX	1,482,341	689,929
Structural shapes (heavy)	12	2	XXXX	XXXX	XXX	274,071	XXXX	1,373,900	30.8	1,416,493	XXXX
Steel piling	4	3	9,421,550	296,643	40.7	18,605	XXXX	67,813	XXXX	72,314	XXXX
Plates (sheared and universal)	27	4	17,080,770	317,960	22.6	303,941	20,024	1,732,530	20.4	1,736,861	117,208
Skelp	5	5	XXXX	XXXX	XXX	18,683	12,551	XXXX	XXX	152,033	71,908
Rails—Standard (over 60 lbs.)	4	6	3,657,000	139,752	46.4	122,416	XXXX	689,180	38.0	672,933	XXXX
—All other	5	7	392,000	12,542	38.9	10,720	XXXX	62,623	32.2	61,094	XXXX
Splice bars and tie plates	12	8	1,745,900	44,722	31.1	44,466	XXXX	261,070	30.1	279,473	XXXX
Track spikes	10	9	349,400	10,843	37.7	11,416	XXXX	60,600	35.0	65,371	XXXX
Hot Rolled Bars—Carbon	33	10	XXXX	548,861	XXXX	422,696	50,849	2,866,526	XXX	2,363,298	292,350
—Reinforcing—New billet	15	11	XXXX	82,188	XXX	97,906	XXXX	402,712	XXX	438,751	XXXX
—Reinforcing—Rolled	12	12	XXXX	10,672	XXX	11,210	XXXX	60,841	XXXX	62,247	XXXX
—Alloy	22	13	XXXX	143,374	XXX	114,337	9,318	692,079	XXX	578,982	57,109
—TOTAL	39	14	22,009,660	789,095	43.4	644,149	60,167	4,025,158	36.9	3,443,298	349,459
Cold Finished Bars—Carbon	24	15	XXXX	94,718	XXX	97,463	XXXX	563,271	XXX	566,028	XXXX
—Alloy	23	16	XXXX	21,592	XXX	18,753	XXXX	99,908	XXX	87,899	XXXX
—TOTAL	31	17	2,891,510	116,310	49.6	116,216	XXXX	663,179	46.9	653,927	XXXX
Tool steel bars	18	18	255,010	9,308	44.4	9,868	XXXX	51,590	40.8	51,343	XXXX
Pipe & Tubes—Butt weld	14	19	2,176,520	96,022	53.6	94,289	XXXX	586,094	54.3	576,310	XXXX
—Lap weld	9	20	750,200	19,272	32.1	19,334	XXXX	112,564	31.1	127,692	XXXX
—Electric weld	10	21	1,536,900	63,634	50.3	54,022	XXXX	324,440	42.5	269,954	XXXX
—Seamless	12	22	3,169,600	144,486	55.4	129,073	XXXX	912,231	58.0	812,191	XXXX
—Conduit (cap. & prod. incl. above)	6	23	XXXX	XXXX	XXX	6,160	XXXX	XXXX	XXX	38,105	XXXX
—Mech. tubing (cap. & prod. incl. above)	11	24	XXXX	XXXX	XXX	31,581	XXXX	XXXX	XXX	192,424	XXXX
Wire rods	25	25	7,293,670	380,497	63.4	88,605	29,951	1,917,938	53.0	456,724	163,593
Wire—Drawn	32	26	3,702,890	294,240	62.7	166,091	12,939	1,509,139	53.3	875,658	63,183
—Nails and staples	18	27	1,260,360	48,342	46.6	50,634	XXXX	254,628	40.7	257,147	XXXX
—Barbed and twisted	12	28	543,610	17,688	39.5	18,208	XXXX	98,398	36.5	97,585	XXXX
—Woven wire fence	15	29	1,121,060	28,421	30.8	28,753	XXXX	175,044	31.4	175,472	XXXX
—Bale ties	12	30	149,700	8,354	67.8	8,978	XXXX	37,416	50.4	40,293	XXXX
Black Plate—Ordinary	9	31	XXXX	XXXX	XXX	56,181	30	XXXX	XXX	323,833	81.9
—Chemically treated	8	32	465,000	9,909	25.9	8,770	XXXX	66,025	28.6	68,993	XXXX
Tin and Terne Plate—Hot dipped	9	33	3,758,850	165,189	53.4	172,765	XXXX	810,421	43.5	863,299	XXXX
—Electrolytic	9	34	2,231,850	70,480	38.4	78,208	XXXX	389,511	32.2	408,283	XXXX
Sheets—Hot rolled	30	35	19,353,520	1,095,467	68.8	469,178	25,265	3,900,201	61.4	2,595,343	162,926
—Cold rolled	13	36	7,127,460	437,409	74.6	315,959	XXXX	2,343,386	66.3	1,707,334	XXXX
—Galvanized	16	37	2,924,130	120,448	50.1	117,187	XXXX	647,621	44.6	650,232	XXXX
Strip—Hot rolled	22	38	7,180,030	187,759	31.8	107,581	19,332	1,018,399	28.6	644,245	101,909
—Cold rolled	34	39	2,067,450	105,554	41.8	107,986	XXXX	594,257	39.0	588,580	XXXX
Wheels (car, rolled steel)	5	40	515,400	15,977	61.6	14,209	XXXX	103,997	66.4	108,363	XXXX
Axles	6	41	398,170	10,894	33.3	7,751	XXXX	54,113	27.4	52,641	XXXX
All other	3	42	169,510	3,234	23.2	545	XXXX	21,010	22.0	2,506	XXXX
TOTAL STEEL PRODUCTS	140	43	XXXX	XXXX	XXX	5,566,628	279,119	XXXX	XXX	22,017,988	1,716,930
Effective steel finishing capacity	140	44	64,059,000	XXXX	XXX	XXXX	XXXX	XXXX	XXX	XXXX	XXXX
Percent of shipments to effective finishing capacity	140	45	XXXX	XXXX	XXX	70.0%	XXXX	XXXX	XXX	63.9%	XXXX

Refrigerator Production Rising

Critical lack of materials and components held output in first half of 1946 to 837,000 units, or 55 per cent below 1940-41 level, but at end of first half production was 32 per cent below prewar average and was climbing steadily

EARLY in 1946, Civilian Production Administration set as its goal mechanical refrigerator output at prewar level by midyear. When midyear arrived, the record showed that while production was climbing steadily it was 32 per cent below prewar average. Strikes and materials shortages provide the explanation for the poor showing. For the balance of the year, the outlook is more promising, but output will continue to be held down by critical lack of materials and components.

Shipments of mechanical refrigerators in 1940-41 averaged 309,000 units monthly. When the war ended in August, 1945, manufacturers prepared to resume operations quickly. They achieved considerable success in this direction for by October shipments were 85,000 units, which rose to 115,000 in November and 125,000 in December.

Then followed a disappointing first quarter of 1946 with 123,000 units in January, only 67,000 in February and 98,000 in March—the direct result of widespread strikes in the steel and electrical industries. With ending of these strikes, refrigerator production rebounded sharply in second quarter to permit factory shipments of 143,000 units in April, 196,000 in May and 210,000 in June.

Thus in six months of this year, shipments of mechanical refrigerators totaled 837,000 units, or 55 per cent below the 1940-41 level.

Production Levels Vary

By midyear, manufacturers were reporting varying degrees of success in attaining projected schedules, reason being that strikes and materials shortages were not affecting all alike. One large producer stated that late in June it had hit an assembly rate of 1000 refrigerators a day, or about 50 per cent of prewar; another major company announced that in July it was at 93 per cent of capacity.

The industry's labor problem continues to be one of obtaining skilled and semi-skilled workers and the training of them for consumer production line jobs.

Like all electrical appliances whose manufacture was restricted during the

war, mechanical refrigerators enjoyed tremendous sales prospects when V-J Day gave the go-ahead sign. Manufacturers accomplished their reconversion programs quickly to resume production of former models and to get new models engineered and tooled up. But before much headway was made, the rash of major strikes broke out and interrupted production and created materials shortages.

Most serious of shortages in steel items has been cold-rolled sheets used for refrigerator cabinets and tin plate used in condensers. However, as short as steel has been and still is, refrigerator

output has been retarded more by other items and components than by enameling sheets.

Copper and copper products have constituted a major shortage for refrigerator parts and fractional horsepower motors. Motors have been desperately lacking and are likely to continue inadequate through most of 1947. Motor makers are swamped with orders and will require many months to catch up if the backlogs continue on the books as firm orders. Contributing to the motor shortage has been lack of copper wire for windings, copper for bearings, inadequate supply of gray iron castings for frames, strikes in motor manufacturing plants, and labor deficiency.

A tremendous demand for mechanical refrigerators exists. Some appraisal of the market was given recently by A. M. Sweeney, manager of sales and major



Assembly of mechanical refrigerators in the first half of 1946 was 55 per cent below the 1940-41 level because of an insufficiency of materials and components, but the outlook for the second half is more promising. NEA photo

Additional Plants May Be Made Available for Multiple Tenancy

WAA considers adding ten properties to its program under which surplus government-owned war plants too large for peacetime operations as single enterprises are being subdivided and sold or leased for use by small businesses

appliances, General Electric Co., who estimates the probable 1947 volume as 7,805,000 units. This output, if attained, would represent an increase of 182 per cent over the annual average for 1940-41, and naturally constitutes pent-up as well as new demand. Curiously, the number of units built in 1941 had shown an increase of 123 per cent over 1935. This gives proof that the American household considers a mechanical refrigerator as essential equipment. If refrigerator production in 1947 hits the 7 million mark it would mean a consumption of around 700,000 tons of steel.

Some fear has been expressed that widespread strikes which affect earnings and dissipate savings, as well as higher prices on all manufactured goods, will cause serious shrinkage in demand for mechanical refrigerators, as well as other household appliances. Whether this is true is a moot question and one that cannot be argued with finality at this moment. For one thing, demand estimates are built up on known orders placed with dealers and under present conditions when deliveries are long deferred it is not known how much duplicate ordering exists.

A shred of light may be thrown on this subject by a survey which a local power company conducted recently in San Diego county, Calif. This tabulation revealed that 19.2 per cent of those who want to purchase mechanical refrigerators will buy first models; 80.2 per cent will wait. However, only 24.9 per cent of these prospective purchasers have registered with dealers; 75.1 per cent have not. In other words, three out of four potential buyers have not made their intentions known, which would tend to support the existence of a tremendous market ahead.

Among new developments in the mechanical refrigerator field is the dual-tempering model—that is, one containing a compartment in which limited amounts of foods may be quick-frozen and stored. While a number of these units have been announced, few have as yet been put into production.

Another development which involves mechanical refrigerators is that of merchandising complete all-electric kitchens. At least two companies are active in this field. One of these, the Edison General Electric Appliance Co. Inc., Chicago, recently allocated the first of these postwar units to 1000 war veterans.

Only a few new companies are entering the domestic mechanical refrigerator field, but 100 or more new concerns are expected to be producing quick freeze and cold storage units by early 1947.

EXPANSION of the War Assets Administration's "multiple tenancy" program under which surplus government-owned war plants too large for peacetime operations as single enterprises are being subdivided and sold or leased for use by small businesses is being considered.

In addition to six large properties already included in the program, the WAA has under consideration for multiple tenancy use ten other plants.

The six properties already under the program are: Bechtel-McCone Aircraft Modification Plant, Birmingham; Consolidated Vultee Aircraft Corp., San Diego, Calif.; Aluminum Co. of America, forging plant, Cannonsburg, Pa.; Basic Magnesium Corp., Henderson, Nev.; Coosa River Ordnance Plant, Talladega, Ala.; and Illinois Ordnance Plant, near Carbondale, Ill.

The ten plants which WAA is considering for addition to the program are: Aluminum Co. of America, aluminum forging plant, New Castle, Pa.; Arkansas Ordnance, Jacksonville, Ark.; Boeing Aircraft Co., Renton, Wash.; Consolidated Vultee Aircraft Corp., New Orleans; Dow Magnesium Corp., Marysville, Mich.; Evansville Ordnance, Evansville, Ind.; Green River Ordnance, Dixon, Ill.; Oklahoma Ordnance, Pryor, Okla.; Rohr Aircraft Corp., Chula Vista, Calif.; and Sangamon Ordnance, Point Pleasant, W. Va.

Smaller Businesses Encouraged

WAA said its objectives in developing the multiple tenancy program are the fostering and development of new independent enterprises, the strengthening and preserving of the competitive position of small business concerns in an economy of free enterprise, the encouragement of employment opportunities, and the protection and salvage of government investment.

While the multiple tenancy idea is not new, WAA is pioneering in an undeveloped realty and industrial field, for experience garnered in multiple occupancy thus far has been confined to tenancy of multi-storied buildings in congested areas.

Contrastingly, all of the large surplus plants involved in WAA's plan consist of one-story structures spread over many

acres of ground, much of which had been converted from farming land.

The Coosa River Ordnance Plant has been sold to the Coosa Valley Development Corp.

The Real Property Disposal Board of the WAA has approved leases of portions of the Basic Magnesium Corp. plant at Henderson, Nev., to six concerns, and sales or leases of portions of the huge Consolidated Vultee Aircraft Corp. plant at San Diego, Calif., have been made to seven firms.

To make the Bechtel-McCone Aircraft Modification Plant at Birmingham, the Aluminum Co. of America forging plant at Cannonsburg, Pa., and the Illinois Ordnance Plant near Carbondale, Ill., available for use by small businesses, the WAA has authorized its respective regional offices to negotiate leases or sales of available portions of the projects.

Plants Costing \$400 Million Offered for Sale or Lease

Surplus war plants, including land, buildings and machinery, which cost the government over \$400 million will be offered for sale or lease by Sept. 30, W. T. Kirby, deputy regional director in charge of real property disposal of the Chicago region of the War Assets Administration, has announced.

Of the 22 war plants to be offered, 13 have been approved and cutoff dates for disposal named. Included are the Republic Steel Corp. plant, South Chicago, acquired at a cost of \$91 million to the government; the \$66 million Des Moines ordnance plant, Des Moines; the \$35 million Inland Steel Co. plant, East Chicago, Ind.; the \$30 million Nash-Kelvinator Corp. plant, Kenosha, Wis.; the \$26 million American Steel Foundries cast armor plant, East Chicago, Ind.; the \$12 million Milwaukee ordnance plant, Milwaukee; and the \$11 million General Motors Corp. aluminum forging plant, Anderson, Ind.

Bids on the Inland Steel plant were to be opened Aug. 23 and on the Republic Steel plant on Sept. 30. Much interest centers on these two because of reports that Henry J. Kaiser intends to bid on both.

Builders Note Decline in New Buying Interest

Machine tool companies making adjustments in operations. Some entering new lines of manufacturing

CLEVELAND

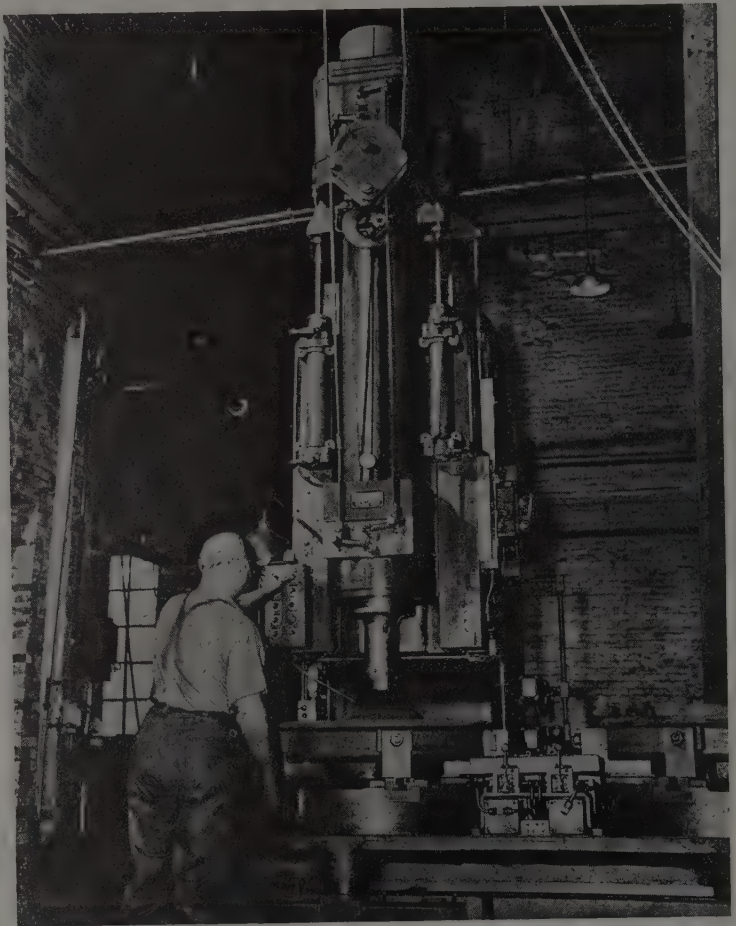
BUYERS note new demand for machine tools has leveled off well below the abnormal rate that prevailed during the war and immediate postwar periods. The decline in buying interest at midyear followed heavy ordering in the preceding months of retooling of plants for production of civilian goods. Some interests in the industry expect a still lower buying level will be established in the near future.

It was pointed out that many of the smaller machine shops and manufacturing plants which have been converted from war work or have been built since V-J Day have been equipped with machines obtained from the War Assets Administration's pool of surplus. This type of buying has accounted for about two-thirds of business transacted in some types of tools.

Although activity now is quiet compared with that of the past six or seven years, shipments during the first six months of the year were at a rate well above that for any period prior to 1940. Machine tool companies are making adjustments in their operations to meet the smaller demand according to their particular situations. Some companies did not expand their plants substantially and have no problem in keeping their facilities operating at an economical rate. Other companies, especially the larger ones which accounted for the bulk of the huge war expansion, have taken various steps in regard to the excess capacity. Some have relinquished their rights to the plants and equipment; others have broadened their field of operations to include the manufacture of allied products, such as various types of machinery, small tools, contract work, etc. or new lines entirely foreign to the machine tool industry.

Inquiry Tending Upward In Cincinnati Area

Cincinnati—Inquiry for machine tools tends upward, indicative of more active domestic ordering expected in the fourth



SPEEDS FREIGHT CAR PRODUCTION: A new railway car wheel boring machine capable of boring 43 chilled tread or steel wheels an hour has been developed by Pullman-Standard Car Mfg. Co. The device, which can handle more than 10 times as many wheels per hour as any previous machine, has been installed in Pullman-Standard's Michigan City, Ind., and Bessemer, Ala., freight car plants

quarter. Deliveries against backlogs have been below original estimates, partly because of scarcity in electrical equipment.

Surplus Tools Offered for Sale at Leetsdale, Pa.

Pittsburgh — A large number and variety of machine tools, valued at 1.5 million dollars, were put up for sale by WAA last week at Leetsdale, Pa. Included are thread millers, turret and engine lathes, drill presses and grinders. Equipment will be made available to public Sept. 4. Sale of miscellaneous surplus goods valued at \$15 million, and including many machine tools, was opened to the public last week at Wardwell, Ohio. Except for special purpose

equipment, active sales were reported at both offerings. The Pittsburgh branch of WAA transacted 270 sales of machine tool sales during July, aggregating \$536,744.

Scrapping of \$75 Million Worth Of Surplus Machinery Authorized

Washington — Owning and disposal agencies have been authorized by the War Assets Administration to dispose of government-owned surplus unsalable machinery as scrap and salvage where it has been determined that no market exists for such machinery in its present form. This special machinery, approximating \$75 million in acquisition cost, was especially designed for production of small arms munitions.

GOVERNMENT CONTROL DIGEST

Weekly summaries of orders and regulations issued by reconversion agencies. Symbols refer to designations of the orders and official releases. Official texts may be obtained from the respective agencies

OFFICE OF PRICE ADMINISTRATION

Scrap: Maximum prices of prepared iron and steel scrap established for all classes of buyers and sellers, effective Aug. 26. Previously, sales of prepared scrap to dealers were exempt from price control. Applicable maximum prices may be charged now for the various grades of scrap contained in mixed shipments, provided the required shipping notice is furnished and the various grades are physically segregated. (MPR-4)

Price Control Suspension: Price control has been withdrawn from 12 special type trailers, specified trailer parts, midjet cars, steelbound skid platforms and rubber bands, effective Aug. 16.

Rental of machines, parts and industrial materials that have been exempted from price control and that are covered by supplementary order 129 has also been lifted from control. (SO-129; OPA-6706)

Consumer Durable Goods: Ceiling prices on 20 classes of consumer durable goods increased, effective Aug. 19, but retailers may not charge the higher prices until they receive shipments ticketed by manufacturers with the new prices. Average price increases at retail include gas kitchen stoves, 5 per cent; electric kitchen stoves, 9 per cent; washing machines, 7 per cent; vacuum cleaners, 7 per cent; all small electric appliances, 4 per cent; radios and electric phonographs, 3 per cent; and other items, 3 to 12 per cent, averaged out for each class of goods. (MPR Nos. 64, 86, 111, 116, 188, 213, 548, 576 and 599; OPA-6707)

Storage Batteries: Resellers of industrial electrical storage batteries given a percentage passon of the increases in their net invoiced costs, effective Aug. 19.

Resellers of lead acid storage batteries, cells and plates may increase their ceiling prices by the same percentage that their net invoiced costs have been raised as a result of higher maximum prices granted manufacturers on June 11. This relieves manufacturers and sellers of a former requirement to supply buyers with separate invoice statements of resultant increases in their maximum net prices. Manufacturers are authorized to revise their list prices for these products and resellers are permitted to sell off revised lists, subject to the same discounts, allowances, and other conditions in effect May 31, 1946. (MPR-136; OPA-T-4859 and 4861)

Liquid Commodities: Charges for transportation of liquid commodities, except milk, in tank trucks by contract motor carriers are suspended from price control. (MPR-566 and SR-11 to GMPR; OPA-T-4866)

Automotive Parts: Manufacturers' maximum quotations for automotive parts increased 15 per cent as of Aug. 24 over base date freeze prices, except as follows: Dump bodies and hoists, 24.5 per cent; general purpose anti-friction bearings, 12 per cent; fan belts, 17.3 per cent; radiator hose, 26.3 per cent; engine and engine parts, 15.5 per cent. (MPR-452 and 453; OPA-T-4881)

Machines and Industrial Equipment: Brand-name sellers of machines, machine parts and industrial equipment who do not make the products sold under their brand names are no longer designated as manufacturers under the regulation covering these products, effective Aug. 20. Sellers who have other manufacturers make or process the machines and parts sold under their brand names and who actually serve as wholesalers or retailers may increase their prices the same percentage as their net invoiced costs are raised by their suppliers. (MPR-136; OPA-T-4890)

Plumbing Fixtures: Manufacturers ceiling

prices for cast iron enameled plumbing fixtures increased 10 per cent, effective Aug. 21. (MPR-591; OPA-T-4905)

Cost-Plus Pricing: Manufacturers, converters and wholesalers selling products, priced on a cost-plus basis, which were made from materials bought during the period of no price control, may now base their prices on the ceiling prices of the basic goods at the time of delivery of the finished product, instead of the date of sale. (SO-171; OPA-T-4907)

Refrigerators: Retail prices of household mechanical refrigerators increased about 6 per cent, effective Aug. 21. Manufacturers were granted an increase of 3.5 per cent. (MPR-598; OPA-6715)

Exports: Export ceiling prices continue to be calculated on basis of domestic prices plus actual export expenses and a mark-up. However, exporters now may use an export mark-up based on their own individual average during any six-months or 12-months period between Jan. 1, 1939, and Dec. 31, 1940, instead of using the average in the trade. If an exporter made no sales between those dates, he is permitted to use his average mark-up during the nearest 12-months period before Jan. 1, 1939, in which he made sales.

Specific formulas are provided for determining ceiling prices on exports of iron and steel, bituminous coal, relaying rails, and certain other products. (Export Price Reg.; OPA-T-4888)

Construction: Amount of compensation paid by employers for employee insurance and pension benefits may be added to ceilings on construction services and sales of installed building material. (MPR-251; OPA-T-4775)

Slide Fasteners: Reconvert manufacturing of slide fasteners may use either a 3.6 per cent profit percentage or a profit percentage computed on the basis of their individual operating experience between 1936 and 1939. (MPR-188; OPA-6623)

Fountain Pens: Manufacturers of fountain pens and mechanical pencils may calculate wholesale and retail ceilings for new models, once their own ceilings are approved. (MPR-564; OPA-T-4780)

Fixed Capacitors: Manufacturers of fixed capacitors granted an additional interim increase of 10.2 per cent over their base date prices, effective Aug. 12. The action provides that the increase factor previously granted producers of these parts be increased from 16.4 per cent to 26.6 per cent. (MPR-136)

Aluminum Wire: Effective Aug. 12, maximum prices in effect June 29, 1946, may be increased as follows: Aluminum steel reinforced transmission line cable, 12 per cent; weather-proof aluminum wire, 17.5 per cent; insulated aluminum wire and cable, 18 per cent. (MPR-82; OPA-6075)

Wiring Devices: Manufacturers' ceilings for electrical wiring devices increased by from 10 per cent to 20 per cent, effective July 27. (MPR-136; OPA-T-4811)

Hardware: Increases ranging from 10 to 50 per cent over June 30, 1946, ceiling prices authorized July 26 for manufacturers and resellers of specified items of hardware, hinges and butt hinges. (MPR Nos. 591, 40 and 413; OPA-6630)

Suspension: Following products have been exempted from price control, effective Aug. 14: Cast metal lawn furniture; metal beach and lawn umbrellas; crystal radio receiving sets; commercial type scales; and approved therapeutic lamps. (SO-126, MPR-188; OPA-6685)

Carbon Products: Manufacturers' prices for carbon products increased 11 per cent, effective Aug. 13. The carbon products covered include: Carbon, graphite and metal graphite

brushes and contacts and other items of the same composition for electrical and mechanical use except electrodes for electric furnaces and carbon or graphite anodes for electrolytic cells. (MPR-136; OPA-6658)

Lighting Fixtures: An interim increase of 10 per cent over base ceiling prices for lighting fixtures and parts has been granted to manufacturers. All types of nonportable lighting fixtures, both fluorescent and incandescent for industrial, commercial or residential use and all parts for these fixtures are covered by this action. (MPR-136; OPA-6660)

Metal Furniture: Manufacturers' maximum prices of metal household furniture increased 7 per cent, effective Aug. 12. Resellers absorb 5 per cent and pass on 9 per cent of the total increase of 14 per cent that has been permitted the industry. Resellers of commercial metal furniture, fixtures and equipment may pass on the first 10.5 per cent through dollarwise, as before, but any additional manufacturer price increase may be added to the reseller's base price on which he takes his customary markup. (MPR-188; OPA-T-4835 and 4855)

Switch Boxes and Covers: Maximum prices for boxes and covers for electrical outlets and switches have been raised 19 per cent, effective Aug. 17, at the manufacturers' level. Resellers may add the same percentage amounts to their ceiling prices as their net invoiced costs are raised. (MPR-136; OPA-T-4855)

Tools: OPA no longer requires wholesalers to invoice the following products on the basis of an original ceiling and an adjustment charge: Hand-cutting tools, heavy forged and mining tools, mechanical hand-service tools, farm and garden tools, trowels, shovels, spades and scoops. Retailers have been provided a simplified method of pricing, resulting in increases in ceiling prices of 2.2 per cent to 10 per cent. (MPR-614; OPA-6687)

Temperature Controls: Prices of electric temperature controls for automatic water heaters advanced 15 per cent, effective July 26. (MPR-591; OPA-T-4790)

CIVILIAN PRODUCTION ADMINISTRATION

Prefabricated Houses: Producers of "industrially-made" houses, sections or panels who have been approved by the National Housing Agency to participate in the Veterans' Emergency Program are eligible for "CC" preference ratings for production materials not covered by "HH" ratings, and in addition, for construction materials and maintenance, repair and operating supplies. "CC" ratings will be granted for capital equipment for the expansion of plant facilities in special cases. "CC" ratings may be granted for specialized equipment (except for site-preparation equipment) which is either needed for the erection of industrially-made houses, or which will be continually used for the erection of conventionally-built dwelling units under the veterans' housing program, and also for maintenance, repair and operating supplies needed for such equipment. Applications for "CC" ratings by producers of industrially-made houses, sections or panels should be made on form CPA-541-A. (PR-28; CPA-519)

Surplus Material: Urgency certificates will no longer be issued or renewed for surplus items listed in the War Assets Administration veterans' set-aside list, although all outstanding certificates will remain valid until their expiration dates. (PR-13; CPA-524)

WAR ASSETS ADMINISTRATION

Machinery: Owning and disposal agencies have been authorized to dispose of government-owned surplus unsalable machinery as scrap and salvage. This special machinery, approximating \$75 million in acquisition cost, was specially designed for production of small arms munitions. They include, in part, 5-spindle continuously turning machines; various types of bomb manufacturing machines; 6-inch cannular slotting machines; special purpose model B machine; model T-1, T-3 and T-5 cartridge machine; various types of shell lathes; primer inserting machines; super-charger bucket grinders; sliding head mills; impeller mills; swivel rotary mills; duplex spot face mills; planetary mills; muff mills. (Reg. 13; WAA-512)

Windows of Washington

Investigation of irregularities in disposal of billions of dollars worth of surplus war goods beginning to reveal anticipated scandals. Misuse of veteran's priorities to obtain scarce items one of leading complaints

IRREGULARITIES in disposal of surplus war goods are popping up with increasing frequency. Representative Slaughter's House War Surplus Committee has been doing some spade work lately, and is beginning to hit pay dirt, though its inquiry so far has barely scratched the surface. Sensational developments are expected when the committee really gets its teeth into the matter and takes up the broader aspects of the disposal program. So far it has been dealing with peanuts.

What Slaughter's committee wants to know is how brokers and so-called "go-betweens" have been able to get their hands on large quantities of war leftovers, such as bronze wire screen and nails, which, presumably, were destined for veterans and other priority buyers.

The committee recently sparred ineffectually with one smart broker who allegedly profited handsomely on a lot of bronze wire screen which he had acquired. The probers had the broker before them but got nowhere with him. He had a bad memory, his records were incomplete or inaccessible, and the upshot of the whole thing was that the fellow was cited for contempt of the House, which didn't seem to bother him too much. It takes a long time for such actions to develop into anything really inconvenient or annoying to the parties involved.

That scandal has been unearthed in disposal of the billions of dollars worth of surplus war goods and properties should occasion no particular surprise. After all, it would have been something approaching the miraculous were it otherwise considering the perversity of human nature and the sharpies who somehow or other are always around to take advantage of a good thing.

Numerous Complaints Unfounded

Surplus disposal authorities frankly admit of numerous irregularities, but they insist they have been making a diligent effort to keep their house and their noses clean, correcting abuses as quickly as they are scented. More than 1200 investigations of alleged questionable deals, favoritism in awarding goods, and criminal misconduct were initiated by the WAA Compliance Enforcement Division in second quarter of 1946. Numerous rumors, complaints and accusations seem to be the normal byproduct of such mass selling operations as are involved. WAA says,

however, that in the majority of cases the charges have been proved unfounded, whatever faults that have been uncovered largely being attributable to misunderstanding of disposal procedure or of basic legislation.

In those instances where investigation has shown criminal or administrative misconduct, steps have been taken to correct abuses. Findings in administrative cases are referred to appropriate officials for disciplinary action or formulation of corrective procedure. Disclosures of criminality are handled more sternly. To date, according to WAA, there have been 30 arrests, eight of government employees, and 26 indictments for bribery, fraud and theft.

With respect to misuse of veterans' priority certifications, which seems to figure chiefly in most of the complaints most widely publicized, it is pointed out that the extreme scarcity of certain commodities, combined with the high priority enjoyed by veterans in purchasing, has resulted in widespread use of veterans as "fronts" by business concerns. It is not an easy matter to track down such cases. Where violations of this kind come to light, however, they are referred to the Department of Justice. Something like 374 such complaints have been handled by the WAA Compliance Enforcement Division, the majority of them being turned over to the Justice Department for prosecution.

Preferences Lead to Exploitations

In a statement explaining its position, WAA maintains, experience has shown irregularities can be expected whenever a priority, preference or group privilege appears to offer an opportunity for exploitation. In June something like 15 cases were investigated in which county or municipal governments, exercising the priority given them by the Surplus Property Act, purchased automotive equipment ostensibly for their own use but actually for resale to private citizens, a flagrant distortion of the law. WAA doesn't say what it did about these cases, but it is apparent the boys down at City Hall are not averse to making an "honest" dollar when they can.

Illustrative of the difficulties encountered in seeing that surpluses are channeled into proper outlets, in a recent offering of a short supply item restricted to a definite trade level, over 75 per cent

of the individuals or firms that submitted applications were found to have misrepresented their status and to be ineligible. Enforcement of the strict provisions of the law in such instances imposes a terrific responsibility on disposal agency employees, who, of course, are subject to the frailties and failures of others of the species *Homo sapiens*. Obviously, it would be virtually impossible to erect a system which would provide 100 per cent protection against slips of omission and commission on the part of all employees.

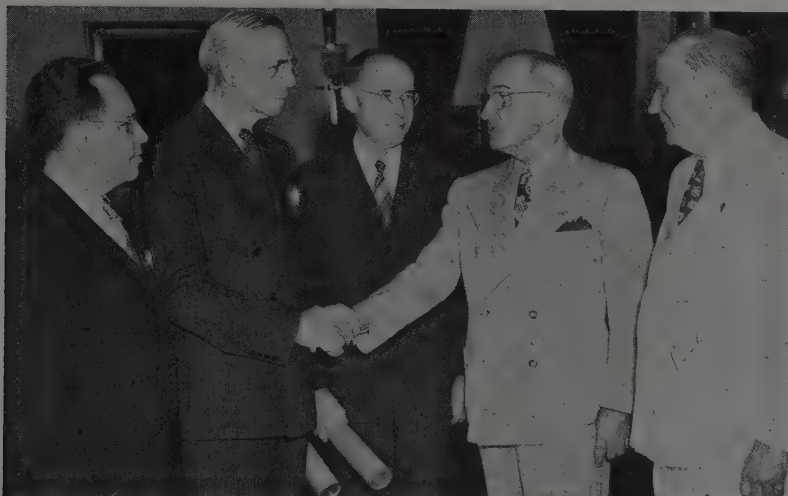
The new War Assets Administrator, Maj. Gen. Robert M. Littlejohn, knows he has a terrific job on his hands and seems determined to give an outstanding performance. He plans to tighten up disposal procedure all down the line, sparing no effort in tracking down abuses surrounding sales to brokers. His order of Aug. 2, which gives priority at WAA sales to the United Nations and other international units, which Representative Slaughter claims is in violation of the law and contrary to the policy of Congress, is to be reviewed, though Littlejohn's staff insists the legality of the order is beyond question.

Littlejohn is a tough, old-time Army officer accustomed to having his commands obeyed. Most observers of the Washington scene feel that if anyone can unsnarl WAA from the present tangle of red tape, legal restrictions, and governmental inertia which has engulfed surplus disposal, he can. By a year from now he hopes to have disposed of some \$27 billion worth of war leftovers. Moving consumer goods items will be a relatively easy task for these are snapped up almost as quickly as they are put up for sale. But sale of industrial plants and such like is a horse of another color. You just don't move factories and heavy equipment at will when millions of dollars investment is required. As of June 30, industrial plant sites and shipyards with original cost of \$992 million had been disposed of, sales netting the government something like 44 cents on the dollar. In the year ahead the government hopes to get rid of some \$6,500,000,000 worth of plants and sites—a man-size job in any language.

Names Economic Advisers

Far more than casual interest for business attaches to the recent appointment by President Truman of the newly created Economic Advisory Council provided by the so-called Full Employment Act.

This council is headed by Edwin G.



President Truman congratulates members of the Council of Economic Advisers who were sworn in by Judge Bennett Champ Clark of the United States Court of Appeals. Left to right are: Leon H. Keyserling, Dr. Edwin G. Nourse, John Davidson Clark, President Truman and Judge Clark. NEA photo

Nourse, vice president of the Brookings Institution, and includes Leon H. Keyserling of New York, and John D. Clark of Wyoming. Mr. Nourse is much better known to the public than either of his colleagues. Mr. Keyserling has been prominent in housing activities and is understood to have strong New Deal convictions. Mr. Clark, on the other hand, once was connected with the Standard Oil Co. of Indiana, and is believed to lean toward the conservative side.

As for Chairman Nourse, he ranks high in the field of economics and is known as an advocate of the private enterprise system. It is said, however, he feels private enterprise must be adapted to the broad ends of national welfare, whatever that means. In an interview upon his appointment to the new post, he classed union executives among the "business leaders," and held that the job of making private enterprise work is primarily the responsibility of both labor and business with appropriate government aid. No one can quarrel very much with him on that. Both business and labor leaders are trustees of the public interest, he feels. As to whether everybody has a right to a job, Mr. Nourse puts it another way, that the government should provide conditions for useful employment. In his new post he may have the opportunity to determine if such an ideal state of affairs is possible.

On the whole the complexion of the council appears satisfactory to business, but the so-called liberals and leftwingers are understood to be not too enthusiastic over the appointments. Whether this lack of universal approval will prove a help or hindrance to the council in developing its program only time will tell. May-

be the council in time will come up with the answer to the problem of averting the ages-old curse of boom and bust which characterizes our economy.

Scrap Shortage Big Worry

Biggest headache for the Steel Division of the Civilian Production Administration at the moment concerns iron and steel scrap supply. About 25 open-hearth furnaces currently are down for lack of scrap and further shutdowns are threatened unless material begins flowing to the mills in larger volume very shortly. Some steelworks are said to have only a few days' inventory.

The seriousness of the situation has not been sufficiently impressed on industry to get the scrap drive going as it should, in the opinion of government officials who are striving desperately to find ways and means of stimulating interest. So far, however, they have been running into increasing discouragement with reports pouring in of dealer and producer hoarding of material in hope of later price increases.

How such hoarding can be discouraged in present circumstances is the \$64 question. And even if it is corrected there is no certainty a large tonnage flow will result since nobody seems to know how large a quantity is being hoarded. Incidentally, in this connection government scrap statistics are wholly inadequate, running several months behind in their compilation. Possibly these figures are useful as a record of the past but certainly they mean little so far as current conditions are concerned.

At the moment a hot-and-heavy debate is going on over the advisability of rais-

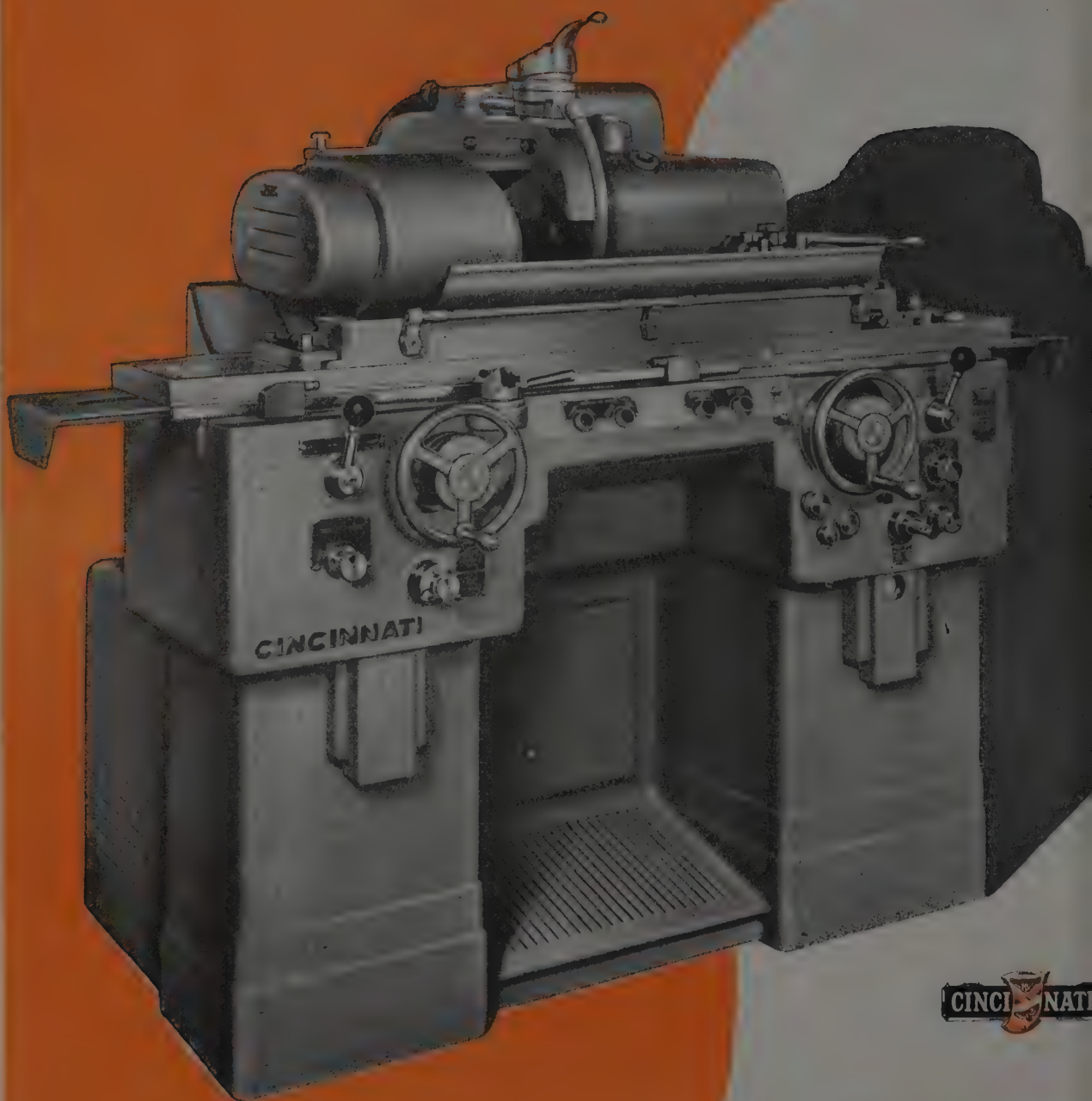
ing scrap prices. Some trade interests insist no amount of urging less than a price boost is going to pry scrap loose. Some weeks ago Office of Price Administration turned thumbs down on an increase, but the hope persists that the agency may change its mind. Until this hope is removed by affirmative action, say market observers, there seems little chance the hoarders will be inclined to release appreciable tonnage.

Scrap is one commodity on which prices have held stationary since the freeze went on at the beginning of the war. Why this material is made an exception when virtually every other conceivable commodity has been upped in price is a mystery. Scrap collection and preparation costs have risen sharply and it would seem only fair that compensatory increases be allowed to offset these advances. OPA, however, has been stubborn about the matter and has resisted every pressure for a change. Probably this is because the difference of opinion on the subject between scrap sellers and consumers is extremely wide. Consumers, meaning the steel mills and foundries, generally speaking, have opposed an increase, though lately it is understood they have come around to a somewhat more liberal view and would not too strongly oppose a moderate boost if such assured a better flow of material. Dealers and collectors, on the other hand, have been pressing OPA for a rise for months past, claiming various benefits would accrue, among them stimulation of peddler collections. Increased collection of peddler scrap would be of particular benefit to the foundries.

Important Sources Blocked

Chief hope for solving the supply problem rests on increasing the flow of production scrap, through heavier shipments from abroad of battlefield material, and by quickening of the shipbreaking program which presently seems to be bogging down as the Maritime Commission and the Navy haggle over arrangements and prices for the sale of vessels earmarked for wrecking.

Incidentally, an interesting story making the rounds is to the effect some scrap tonnage has been moving to certain steel mills on a barter basis lately, being exchanged by the scrap dealers for tonnage of new steel. Such trading, it appears, is legitimate so long as the scrap men dispose of the new steel at, or under official OPA ceiling prices. What they do, it is said, is sell the new steel at warehouse price levels, thus availing themselves of the permitted markup over mill prices. Some consumers are bartering with mills directly. The tonnages involved in such swaps are small.



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British Steel Nationalization Believed Unlikely Before 1948

Industry spokesmen continue to condemn socialization proposals and to voice hope they may be allowed to work out own development program. Holiday influences reflected in lowered mid-summer production. Coal shortage remains serious

By J. A. HORTON
Editorial Correspondent, STEEL

BIRMINGHAM, ENG.

ALTHOUGH demand for iron and steel is interse in Britain, holiday influences are certain to affect production this month. Apart from blast furnaces which for obvious reasons are not closed down, works have been idle in the first week of August.

Plants have been overhauled in many cases in readiness for a long spell of activity until the end of the year. Under these circumstances it seems unlikely that steel output this month will reach the record level attained in May of 13 million tons annually, which compared with an actual output of ten million tons for the year 1938. Exports, too, are likely to fall. In fact home demands are so urgent that the Ministry of Supply has decreed that allocations for oversea business must be smaller in the remaining period of the year.

The nationalization of the industry, one of the projects which the labor government is under a promise to carry out, is still some way off. Parliament may be presented with a bill to put it into effect in the latter part of next year, though the actual transfer could not possibly be completed before the middle of 1948. For the moment, the government is seeking a chairman for the National Steel Board and talks have taken place between Minister of Supply John Wilmot and Dr. H. J. van der Bijl, chairman of the South African Iron & Steel Industrial Corp. According to a statement made by him to the *Financial Times* newspaper he has accepted the task of reorganizing Britain's iron and steel industry on a nationalized basis though he has declined the chairmanship of the National Steel Board.

Leading industrialists continue to voice their condemnation of the proposals. The chairman of William Baird & Co. Ltd., one of the great shipbuilding companies, said recently that in the view of his directors no case could be made out for nationalization, which in view of the complexity of the industry and its export complications would be disastrous to the national economy.

"It is to be hoped," he said, "that the

government may yet see its way to leave this industry free to develop without its nationalization, having regard to its splendid record of production in the war years and its own comprehensive plans for development and further modernization. These the industry would have no difficulty in financing if its continuance under free enterprise was assured."

Opponents of nationalization may derive new hopes from an announcement by the Minister of Supply of the formation of a steel control board charged exclusively to supervise development and reconstruction of the steel industry and to

control production, distribution, and prices. The new board will not advise the government on public ownership plans. The British Iron & Steel Federation will co-operate under these conditions and be represented on the board, presumably with trade union representatives and an independent chairman. Names are to be announced later.

The coal outlook remains serious. Taking a long view, it may well be that extension of mechanization in the mines which has already been adopted with advantage in many of the coal fields, and the use of fuel oil instead of coal, will have favorable results, but these factors cannot affect the situation next winter which will be a critical period of British industry endeavoring to satisfy an intensified home demand and the need to export, without which Britain cannot live.

All the finished steel works are in such a position that there is reluctance to accept fresh commitments. Plate and sheet mills are booked up to the end of the year in some cases; rail mills are

The last American-built locomotive destined for Russia on Lend Lease and other purchases is loaded aboard the specially built locomotive carrier ship, the "Klara Zetkin," at a San Francisco dock. This last shipment of three locomotives brings the total of engines sent to Russia to more than 1200. NEA photo



working to capacity; from the coal mines comes a bigger demand for steel for maintenance and in pursuance of the mechanization program. Makers of automobiles have made a big contribution to the export statistics at the expense of home customers. At the re-rolling works the scarcity of semifinished products.

Pig iron available for distribution barely covers home needs and none is available for export. Demand for light castings will provide work at the foundries for many months but productive capacity cannot be utilized fully because of the shortage of labor.

Output of merchant ship tonnage from Scottish shipyards in the first half of the year showed a considerable increase compared with the corresponding period of any of the years before the war with the exception of the first six months of 1930. This year up to the end of June 39 vessels totalling 176,300 tons were launched from the Clyde, while from yards on the east coast of Scotland output was 26 vessels of 37,700 tons gross. These figures do not include warship tonnage of which there is still a substantial amount building and fitting-out on the Clyde. At the beginning of the second half of the year, Clyde shipbuilders had commenced work on 129 vessels totalling 611,280 tons gross.

Belgium Increases Output Despite Strikes; Coal Supply Improves

Prices may be increased, jeopardizing some pending export business, but outlook for foreign shipments continues favorable. Czech output increasing month by month. France producing at about half of 1938 rate

DESPITE industrial strikes in Liege which, in June, caused a temporary setback in Belgian steel production, the output generally is increasing. Coal production is improving; for the first quarter of this year the average monthly output was 5,686,230 metric tons, compared with 7,730,480 tons in 1938. There are good deliveries of iron ore from France and Sweden. Manganese ore is coming from Brazil, and also from South Africa, Canada, India and Belgian Congo. Scrap is still scarce. It is stated that Belgian and Luxemburgian works together have 1,250,000 tons of orders on their books, of which from 60 to 70 per cent are for export. The demand continues brisk, chiefly from South America, but some works are temporarily out of the market. An inquiry from American firms has been reported to cover concrete bars, wire rods, galvanized and fencing wire. Negotiations are also said to have been taking place with the British Iron & Steel Corp. covering the purchase of 20,000 tons of Belgian rolled products. A small tonnage of wire rods has been sold to China for £30 15s. (\$123.003 per ton fob Antwerp).

Price Competition Increasing

There are strong indications of a further increase of Belgian prices to be shortly made. Already at the present levels, Belgium and Luxemburg have lost some orders. Locomotives for India have gone to British firms; shapes and rails for Argentina and Brazil, amounting to about 60,000 tons, are said to have been captured by competing United States firms. Export quotations for Sweden have been raised following the revaluation of the Swedish crown, and steel bars for Sweden are now quoted at 4000 Belgian francs (\$90.90) per ton fob Antwerp. For free markets, where no special agreement is in force, the current price ranges from 4500 francs (\$104.55) to 4800 francs (\$109.10).

Despite these difficulties, Belgian and Luxemburgian export is going ahead. The two countries have renewed their trade agreement and their exports of steel have reached their highest postwar level in May with 138,500 tons as against 71,800 tons in January. The combined output of the steelworks of both countries

is now 65 per cent for pig iron as compared with the first quarter of 1938; for steel ingots the output is 81.6 per cent and for steel castings 67 per cent. For finished products the combined production exceeds 100 per cent of the output for the first quarter of 1938.

It is officially reported that in accordance with the protocol signed with Argentina on May 14, about 350,000 tons of Belgian and Luxemburgian steel products (including 100,000 tons of steel bars) will be exported to Argentina in one year. A trade agreement with France provides for exports of 180,000 tons of Belgian and Luxemburgian steel.

Czechoslovakia

Recently the Czech premier stated before the National Assembly that the iron and steel target for 1946 was pig iron: 1,400,000 tons; steel, 2,200,000 tons. Last returns show output for May as 81,207 tons of pig iron and 131,065 tons of steel. Production is increasing from month to month.

France

Present output of steel represents an annual production of 4,100,000 tons, with an upward trend. In Lorraine there were 13 blast furnaces in operation out of 46, according to April returns. More have been blown in since. Schneider's output of steel reached 125 per cent of 1938 production, but that is an isolated case.

Total output of French pig iron for the first six months of the year amounted to 1,332,000 tons as against 3,177,000 tons in the first half of 1938. For steel the figures are 1,772,000 tons and 3,228,000 tons respectively. A new French syndicate of iron and steel merchants has been formed.

Italy

It is reported that present output of steel is 39.4 per cent of the output of 1938. The main obstacle to improvements is lack of coal supplies.

Russia

According to a report from *Soviet News* the goal for 1950 is: Pig iron, 19,500,000 tons; steel 25,400,000 tons.





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One-millionth passenger car produced since Jan. 1 rolled off assembly line last week while total truck production reached the 500,000-mark. Total vehicle output thus far this year is only about one-third of what had been hoped for

DETROIT

SOME PASSENGER car rolling off an assembly line last Monday earned for itself the distinction of being the one-millionth to be built since Jan. 1. No record is available to indicate what make or model it was, or how many light repairs it required before it could be shipped to a dealer. As a matter of fact, No. 1,000,000 probably hung its radiator grille in shame for it was five or six months overdue according to the original post-V-J Day planning of the automotive industry.

Probably on the same day truck No. 500,000 for the year also bounced into a distribution lot, bringing total vehicle production for the year to about one-third of what had been hoped for the full year.

History, of course, remains history, sour or sweet, and turning to the future for a more encouraging outlook, it is seen that weekly assemblies currently have lifted better than 10 per cent from the pace of the past two months and are now at the 90,000 level, even showing some possibility of touching 100,000. At best, however, it is unlikely the 1946 total will eclipse 3,500,000.

GM production in the week ended Aug. 17 shot up 15 per cent from the week previous, with car and truck assemblies totaling 33,952, compared with 28,603 for the week ended Aug. 10. Principal gains were registered by Buick and Chevrolet.

Production Schedule Uncertain

Apropos of assembly schedules, one disgruntled top executive of a leading manufacturer said the other evening, "I've just authorized the eleventh reduction in our projections to year-end, and it's going to be the last one. I told our boys that maybe they could complete the schedule by Thanksgiving, maybe it would take them until Christmas, but there would be no more changes." His inference of course was that work on the 1947 series would start the minute the 1946 program was completed, but it might take until Christmas to accomplish this.

Despite increased production in the second quarter, passenger car builders sustained a net loss of over \$45 million during the first six months of the year. This loss of more than 3 per cent on

every sales dollar, calculated after allowances for tax credits under excess profits tax carryback provisions, is approximately one-third of the loss recorded for the first quarter, when the figure was 10 per cent, and is about half the 6.7 per cent loss averaged in the sorrowful year of 1932.

A specific case—Packard—is somewhat at variance with the average, but has a number of interesting aspects. Even though assembly lines were able to work 49 days in the second quarter in comparison with 9 days in the first, net loss on factory production for the first half exceeded \$2.5 million. In-

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Tabulated by Ward's Automotive Reports

	1946	1941
January	121,861	524,073
February	83,841	509,332
March	140,777	533,878
April	248,318	489,856
May	247,620	545,321
June	214,511*	546,278
July	334,500*	468,897

Estimates for week ended:

Aug. 3	79,385*	62,146
Aug. 10	77,825*	41,795
Aug. 17	88,560*	45,550
Aug. 24	90,000*	45,525

*Preliminary.

come tax credit under the carryback was estimated at approximately \$2.2 million, and a further transfer of \$420,000 to operations from a previously created re-conversion reserve yielded net profit of \$43,799, to which was added net profit from field sales subsidiaries of \$705,719, making consolidated net profit of \$749,518. This might be called a neat bit of bookkeeping "ledger-demean" but it may be more comforting to stockholders than that \$2.5 million operating loss. Tax credits, in the opinion of George T. Christopher, president, have amounted to a prior loan to the government out of wartime earnings, so the return of a portion of them to cover the heavy costs of getting back into peacetime business is justifiable, but until the end of the

year they can be only estimates, as a later profit from plant operations reduces the credit accordingly.

New Purchasing Department

Additional shifts in purchasing activities at Ford Motor Co. involve the establishment of a separate purchasing department at the Lincoln-Mercury Division in connection with the organization of this unit as an independent administrative entity of the company. Production purchasing for the Detroit Lincoln plant, and later on the new branch assembly plants at Metuchen, N. J., and Los Angeles, will be carried on at the division's purchasing department at 6200 West Warren Avenue, with George W. Walker (not to be confused with Designer George W. Walker) as director. He returns to the plant where he served as purchasing agent when the Lincoln Motor Co. was acquired by Ford in 1922. Thereupon he moved to the Highland Park plant and has remained with the company ever since. During the war he was co-ordinator of purchasing activities for many of the Ford contracts, including the Sperry gun director, tanks, armored cars, jeeps and universal carriers. After V-E Day, he became co-ordinator of purchasing activities on civilian trucks.

Assisting Mr. Walker are five buyers . . . Thomas Donohoe, veteran of 31 years with Ford, is buyer of rough castings and forgings.

Harry F. Roberts, who joined Ford in 1920, is buyer of ornamental hardware, die castings, textiles, rubber parts and tires.

William A. Stewart, who started with Ford at Highland Park in 1917, is buyer for bodies, body fittings, moldings, door window assemblies, seat frame assemblies, speedometers, instruments and glass.

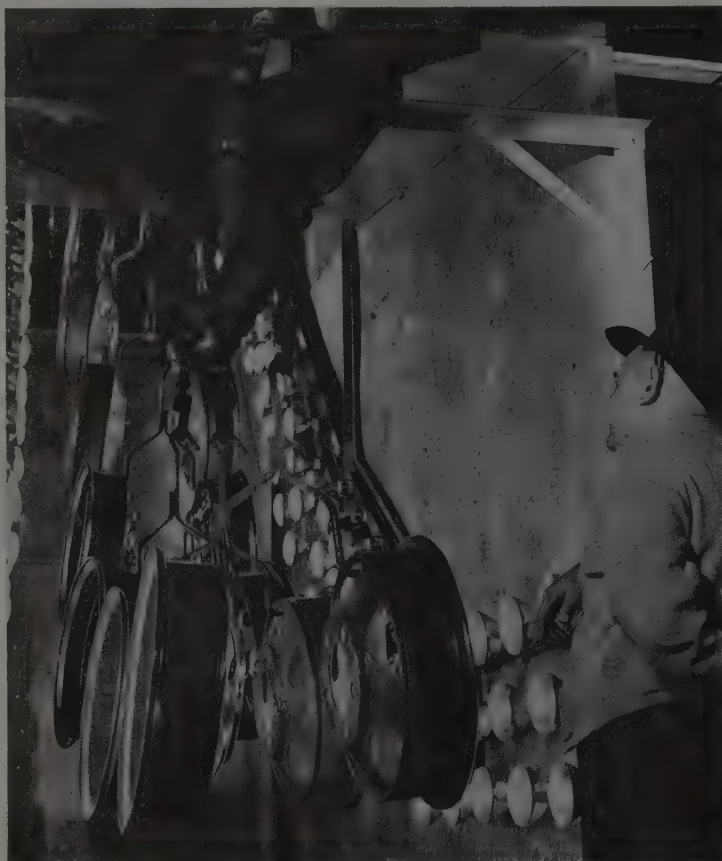
Chris P. Reinke, a 21-year veteran, is buyer for machined forgings and castings, bearings, assembled units for engines, body frames, bumpers and all screw machine parts.

Andrew J. Greening, formerly with Commercial Investment Trust, is Lincoln buyer for electrical equipment, carburetors, radiators and accessories.

Ford Paint Making Described

Interesting details have been released on Ford paint manufacturing operations, centered at the Highland Park plant, where more than 20,000 gallons of automobile body enamel will be manufactured under peak production. Four electrically heated cooking kettles operate

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CUTS PAINT DRYING TIME: A battery of infra-red lights flanking the truck wheel conveyor at Studebaker Corp., South Bend, Ind., reduces the paint drying processes from one hour to 20 minutes. After passing between the lamps the wheels begin an ascent to second-floor drying ovens

day and night to process the synthetic resins which form the base of Ford enamels. Largest of the cookers has capacity of 1500 gallons, two hold 1000 and one 500 gallons. Resins of the glyceryl phthalate type—soybean oil modified—are cooked at temperatures ranging from 425 to 450 degrees F., time varying from 6 to 12 hours depending upon type.

When all properties of the batch are adjudged correct, it is poured from the cooker into thinning tanks where it is mixed with high-solvency naphthas. Next step is through filter presses where small particles of gummed oil and impurities are removed. The resin, now thinned and filtered, is pumped into large ball mills where concentrated color or dry pigment is added.

At the paint plant are 59 water-cooled ball mills, each 6 feet in diameter and 6 feet long and accommodating 12,000-20,000 pounds of $\frac{3}{4}$ -in. steel balls. About

1000 pounds of paste or pigment is charged into each mill where it is tumbled for 24-100 hours depending upon the color. The grinding completed, the color paste is ready for the mixers—deep steel tanks with rotating blades into which the color paste and additional resin are pumped and mixed until the proper color balance and consistency is reached. In this so-called "tinting" stage, the skills of a crew of expert color matchers are required to bring the batch to the exact shade of the various master colors. As the mix goes on, frequent samples are taken and sprayed on small steel panels which are baked for an hour at 240 degrees, just as in body painting, and checked with master panels of the same color.

The synthetic enamel type of body finish, used by both Ford and Chrysler, contrasts with the Duco type of finish used by General Motors divisions. You can argue for hours with industry paint

experts and never get much agreement on which type is best from the standpoints of beauty, durability, long life, etc. One well-known characteristic of the Ducos is their tendency to rub off appreciably in washing and polishing, leading some to believe the enamels to be superior in durability.

Improves Working Conditions

Expenditure of about \$1000 each for the 900 employees in the cold heading department at the Ford Rouge plant is being made to transfer operations from the basement of the rolling mill to the armor plate building, erected during the war and recently purchased from the DPC. The funds of course do not go to the employees, but their working conditions should be improved considerably, since the new building is 1100 feet long with large windows the full length of both sides. Included in the program are remodeling of the building, installation of lunchroom and washroom facilities, construction of new conveyors and moving 800 headers and other equipment.

New Frazer Tractor Coming

A two-plow Frazer tractor, with a complete line of 34 tractor-drawn implements, soon will expand the present Graham-Paige farm equipment program under way at Willow Run. Field experimental tests on the tractor have been completed and it is planned to initiate production this fall, along with the line of hydraulically operated implements such as combine harvesters, corn pickers, grain elevators and hay balers, as well as 57 farm tools—plows, wagons, etc.

Technical Center Delayed

Delay in proceeding with construction of the \$20 million technical center announced last year by General Motors Corp. is understood to be attributable to soaring building costs which, despite considerable paring of original plans for the project, made it appear expenditure of several times the original estimate would be required. Reported decision is to shelve the project until costs are more reasonable. However, organization of personnel for the new research and development center are proceeding, one of the first new groups being a process development section, in charge of Harold Johnson, formerly associated with the standards department, specializing in machine tools.

Nash-Kelvinator Buys Plant

Nash-Kelvinator Corp. has purchased the Ford Motor Co. of Canada plant in Toronto, Ont., for assembly of Nash automobiles and parts distribution.

THE MACEDONIAN SURPRISE PARTY

When the proud Persian hordes plunged headlong at Philip of Macedon's army, they were dumped into the minor leagues by an entirely new strategy, the phalanx: a solid wall of warriors sixteen ranks deep. Strength-in-depth withstood and defeated the impact of an over-confident enemy.

Molybdenum steels are economical means of getting the strength-in-depth called hardenability. With it, you're assured of dependable performance under severe service conditions. Practical facts are available to show you where molybdenum can go to work for you.



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CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

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New Crossing for Frisco Bay Proposed

Project, likely to be either causeway or over-water bridge, would cost \$100 million, and require thousands of tons of steel. Army-Navy Bridge Board conducts hearings on various proposals and will make recommendations to Washington this autumn

SAN FRANCISCO

ANOTHER transportation link across the San Francisco Bay is believed likely, although its completion is certain, to be a number of years away.

If present plans materialize, the structure is almost certain to be either an over-water bridge or a causeway. There now appears little chance of construction of an underwater tube between San Francisco and the East Bay shore.

Whatever is finally constructed, it will be as much of a "world wonder" as the present San Francisco-Oakland bridge, longest in the world. It is also almost certain to cost at least \$100 million, and probably more. It also goes without saying that either a bridge or causeway will be the outlet for many thousand tons of steel.

The need for another bridge or its equivalent arises from the steady growth of the San Francisco area in population, both in numbers of people and in numbers of automobiles. When the present bridge was opened in 1936, its unprecedented six-lane, double-decker design was believed sufficient to take care of all traffic for many years to come. However, by 1941 it had become a bottleneck, being unable to handle the flow of autos at peak travel times. Today, congestion on the bridge at peak hours is greater than ever before.

In order to build a new over-water crossing, it is necessary to obtain approval of the Army and Navy, both as to form and location of the structure.

Bridge Board Holds Hearings

In San Francisco recently a joint Army-Navy Bridge Board heard witnesses propose various plans for the project, and took testimony both for and against the proposals. This board will consider the various plans and make its recommendations to the War and Navy Departments in Washington, probably next fall, and the final decision will be made by Washington officials.

Probably the most unique proposal advanced at the hearing, and one given at least an equal chance of approval, is for a huge causeway across the bay.

This project is planned like this:

The causeway would be an earthen

fill, 2000 feet wide. It would be broken at the eastern end to provide a 2000 foot channel for passage of ships. The connections between the causeway at this gap would be made by underwater tubes.

In the center of the causeway would be a 400-foot paved strip wide enough for a minimum of 30 lanes of automobile traffic.

There also would be two 40-foot strips for railroad tracks and two 120-foot strips for rail sidings. On the outside of the causeway would be two 640-foot strips which could be developed commercially or turned into parkways.

Nine tubes would be constructed for the underwater portion, of which seven would be for auto traffic and two for rail tracks.

It is estimated that the cost of this causeway would be about \$100 million. An equal amount, it is said, would be necessary to construct a ten-lane bridge over the water.

Kaiser Shipyard May Be Converted to Breaking

The U. S. Maritime Commission has ordered Henry J. Kaiser to discontinue ship repair activities at the Kaiser Richmond No. 3 yard, last of the four big Richmond facilities to go out of wartime service. It is proposed that the yard be used for scrapping surplus vessels.

At present the yard is employing about 3200 people, and if scrapping operations subsequently replace present repair activity not more than 500 persons would be employed. Mr. Kaiser joined by officials of communities affected by the order are protesting the action to the Maritime Commission.

California Employment Continues To Increase

Civilian employment in California, still showing steady increases, is expected to equal the wartime peak by the end of September.

The California State Reconstruction & Re-employment Commission estimated

employment at 3,338,000 in June, a new high for 1946 to date. It is expected that the number will increase to 3,553,000 in September. Seasonal declines in food processing is expected to reduce the figure in October, but all other lines are expected to remain relatively high.

The number of unemployed in the state in June was estimated at somewhere between 410,000 to 460,000, or approximately the same number as in May.

Copper Supply at Alltime Low in Southern California

LOS ANGELES

Copper, both as building material and as the raw material for countless other manufacturing operations, is at an unprecedented low level of supply in Los Angeles.

Makers of fractional horsepower motors and magnetic equipment in general are hard hit. Although immediate causes of the depletion—a series of strikes now settled, which for some months shut down most copper mines—exist no more, inventories will remain low at least until late in 1947.

An official of the Phelps-Dodge Los Angeles office said:

"Another prime cause for the lack of copper lies in the unprecedented demand for it, both during the war years and the present period. Reductions in stocks brought about during wartime have never been equalized because the needs of reconversion in this area, as in the nation, have augmented not decreased the demand."

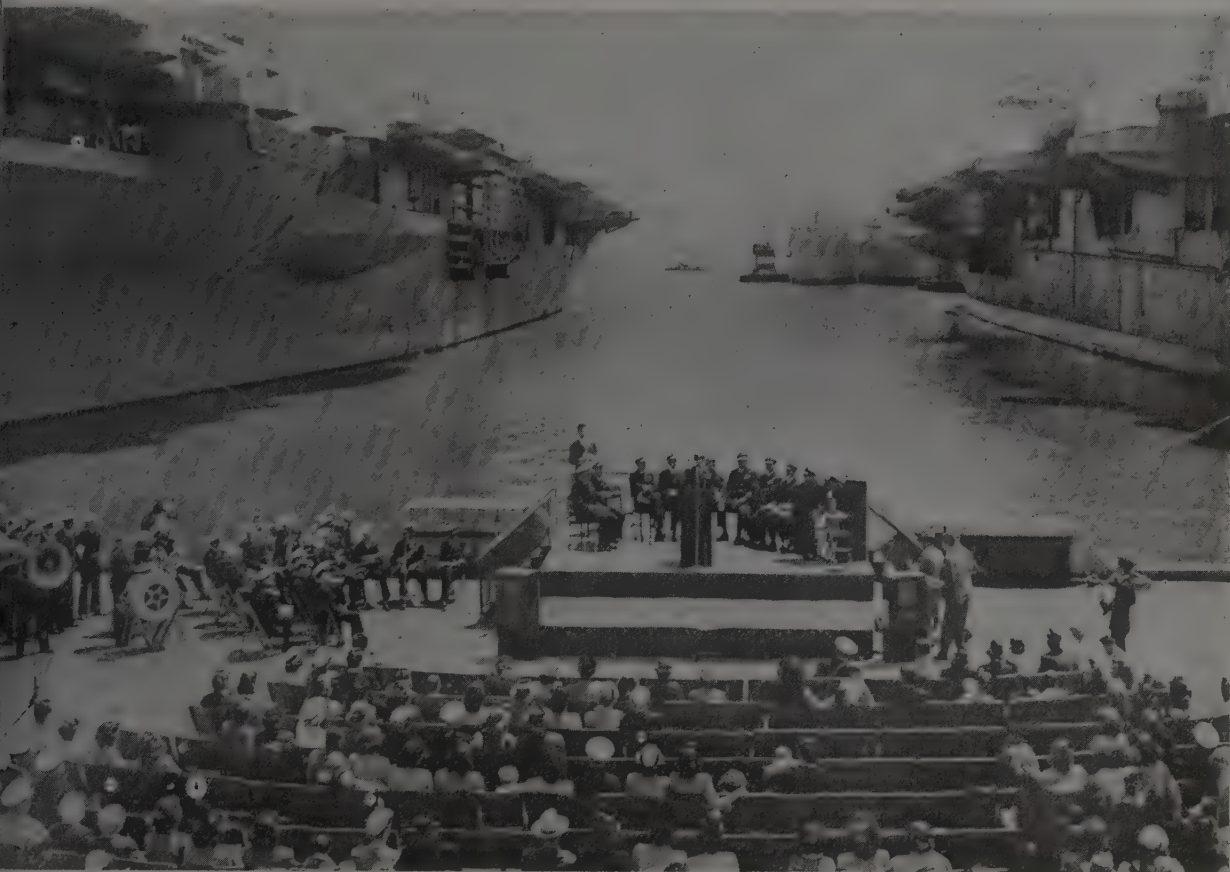
Still another hindrance to copper fabrication industries is the lack of machines due in turn to delays in making and delivering of such equipment, which is traceable to steel shortages.

Plans Projected for New Narrows Bridge at Tacoma

SPOKANE, WASH.

Members of the American Society of Civil Engineers, in a three-day national convention here, were told of the engineering studies following the collapse in 1940 of the Narrows bridge near Tacoma due to a high wind.

Failure of the suspension span spurred research which it is believed will result in safeguarding future structures of this type. The engineers outlined lessons learned from the catastrophe and as-



Two aircraft carriers, "USS Hornet," left, and "USS Intrepid," became part of the Inactive 19th Fleet in ceremonies at the Hunters Point, Calif., Navy Yard on the first anniversary of V-J Day. The ships were totally dehumidified before becoming a part of the "moth ball" fleet. NEA photo

Sheffield Steel Seeks To Buy U.S.-Owned Plant at Houston; Will Double Capacity

HOUSTON, TEX.

PROGRAM calling for nearly doubling the capacity of the Sheffield Steel Corp.'s plant at Houston is announced by R. L. Gray, president, Sheffield Steel of Texas, contingent upon acceptance by the War Assets Administration of the company's bid for acquisition of wartime units operated by Sheffield.

The nearly \$6,000,000 expansion program, which is already partly under way, will be pushed to completion upon approval of the Sheffield bid for acquisition of a government-built open hearth and hot topping facilities, a blooming mill and a shell-forging plant. With approval of these bids, Mr. Gray said that Sheffield will rush to completion and expansion its wire mill and warehousing facilities which involve an expenditure of \$2,400,000. Completion of the present wire mill construction program is expected within 90 days. The company also plans construction of two new open hearths and other finishing facilities costing \$2,574,460. Additionally a new blast furnace and coke plant would be

constructed under the projected plans.

The Houston plant is charging its furnaces with scrap metal almost exclusively now and is therefore running at something near 50 per cent of capacity. Two of its five furnaces are operating about full time, with a third operating intermittently as supplies permit. The scrap situation remains tight but has not yet forced a complete shutdown, though at times the scant receipts have threatened temporary suspensions.

During the war the Sheffield Houston plant used considerably more than a thousand tons daily of East Texas iron ore in its blast furnaces, an ore for which the plant was especially designed to use after extensive surveys of the deposits.

The company is known to regard the East Texas ore as of good quality. The East Texas ore is said to have a recovery of about 43 per cent for Sheffield.

The Houston plant is the only completely integrated steel mill in this area. Its products are marketed chiefly in Texas, with currently only a relatively small portion going to Louisiana.

serted that a safe bridge can be built at the Narrows by applying the aircraft engineers' principles of decreasing wind resistance.

Speakers were Charles E. Andrew, consulting engineer, Washington Toll Bridge Authority, Dexter Smith, the authority's designing engineer, and Prof. F. B. Farquharson, department of civil engineering, University of Washington.

The new structure will require about 17,000 tons of shapes, but parts of the original bridge, piers, anchorages and approaches, estimated at \$3 million will be utilized. Mr. Andrew stated the new span will have four traffic lanes instead of two.

To offset wind pressure the new design calls for deep open trusses instead of plate girder stiffening members, open-trussed floor beams, a reduced frontal area broken into small pieces, a new streamlined line action and open steel grid slots between each traffic lane and at the curb.

Foreign Trade Outlook Good, Executive Says

President of Westinghouse Electric International asserts American "know how" is most needed exportable product

AMERICA'S booming foreign trade will maintain its present record pace for at least the next three to five years, after which it will rapidly recede to prewar proportions, William E. Knox, new president of Westinghouse Electric International Co., New York, predicted recently in that city.

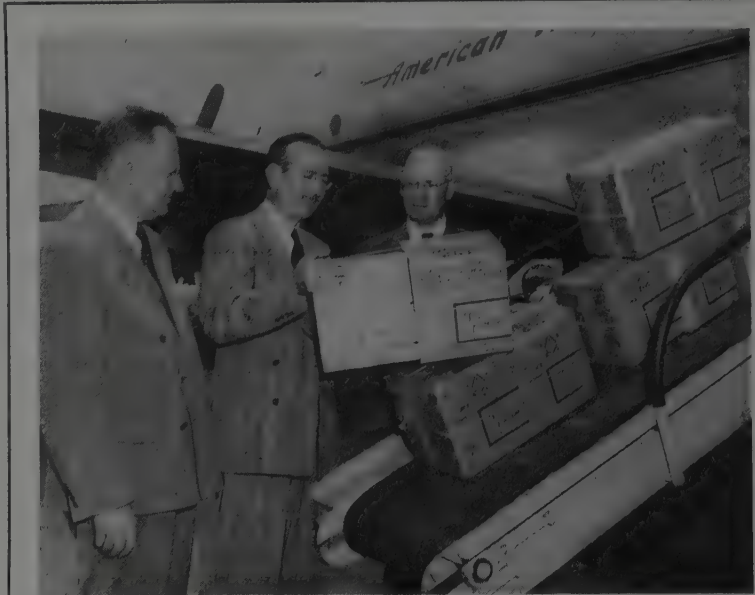
This nation is now the world's primary source of industrial supply as a result of the war which eliminated Germany and Japan and to a large extent England as producers for world consumption, Mr. Knox asserted.

Our sellers' market in which price is of little importance will end quickly when industrial nations disrupted by the war get back into volume production, Mr. Knox said, and when that happens the heavy, standard types of industrial machines which have traditionally been manufactured at less cost in foreign countries whose workers' wages and standard of living are far beneath our own will again be supplied by these foreign industrial nations.

When competition for world markets will again be a source of concern for all countries with products to export, the United States will have three major products to export, Mr. Knox said. "We can sell the world consumer goods and other products of our technological superiority; we can sell material wealth—raw materials; and we can sell brains. And it's the last of these that is in greatest supply and simultaneously in greatest world demand," Mr. Knox asserted.

Export of "Know How" Undertaken

To make this "know how" available in the form of technical assistance contracts is a basic part of Westinghouse's foreign trade philosophy, Mr. Knox said and pointed out that the company has recently contracted with Mexico and China for this technical assistance. The Chinese plant, which will be devoted to the building of motors, will likely be erected near Shanghai and will employ approximately 3800 persons. Westinghouse will supply the interior design of the plant and will supervise installation of equipment and manufacture under a 20-year agreement. Compensation for the first ten years will



FLYING HOUSEWARES: The first plane shipment of American-made housewares and kitchen utensils to Mexico was dispatched from Chicago Municipal Airport recently. On hand to supervise the loading were George C. Payne, regional manager of the U. S. Department of Commerce in Chicago; Alcandro V. Martinez, center, Mexican Consul General in Chicago; and Lee B. Thomas, president, Ekco Products Co., Chicago, manufacturer of the merchandise

be on a lump sum basis and for the second ten years on a royalty basis. Approximately \$15 million of machine tools and other equipment for this Chinese plant may be purchased in this country, Mr. Knox indicated.

Future trade with the South American countries was thought by Mr. Knox to be a bright spot in American exports. These nations are now going through an industrial revolution, Mr. Knox said and predicted that it will lead to increased manufacturing, a generally higher standard of living and, in the long run, to a more lively business with the United States. Mr. Knox said approximately 30 per cent of his company's export trade is with Latin American countries.

Although the export activities of the company are obviously its most important operation, the company having an export backlog of between \$55 million and \$60 million, not including industrial merchandise, its import activities are not being neglected.

Illustrating the diversity of this trade, Mr. Knox said that printed silk from Italy, leather hand bags from Argentina, and \$500,000 of chrome ore from South Africa have been received.

Westinghouse properties in war devastated countries were discussed by Mr. Knox who pointed out that the status of Westinghouse holdings in France, Italy

and Japan would remain in doubt until peace pacts have been signed. The company had no properties in Germany, Mr. Knox added.

Currently Westinghouse has 213 distributors in 89 foreign countries, according to Mr. Knox.

Continental Machines To Operate Iron Powder Plant

Construction of a plant to convert iron carbonate slate to pure iron powder is under way on the Mesabi Iron Range in Minnesota. Being financed by the state, the facility will be operated by Continental Machines Inc., Minneapolis, and will have an estimated capacity of 5 tons of iron powder per day.

Iron carbonate slate in the past has been a waste product overlying the iron ore formation and is present in great abundance, uniform in composition and easily accessible. As a result of a conversion process developed by the late Charles V. Firth, Mines Experiment Station, University of Minnesota, the slate is reduced to iron powder of controlled physical characteristics with a purity of over 99 per cent.

Continental Machines Inc. has named John R. Daesen president of a new division, Iron Inc., to operate the plant and market the product.

BRIEFS

Paragraph mentions of developments of interest and significance within the metalworking industry

Inland Steel Co., Chicago, has licensed Carnegie-Illinois Steel Corp., Pittsburgh, and other United States Steel Corp. subsidiaries to manufacture and sell Inland's Hi-Bond reinforcing bar for concrete construction.

The Coremakers Inc., formerly located at 1811 W. Carroll Ave., Chicago, has moved to 4435 W. Division St., Chicago 51.

Independent Pneumatic Tool Co., Chicago, has opened a branch sales office at 220 West Seventh St., St. Paul, which will be managed by Joseph A. Bell.

Pittsburgh Plate Glass Co., Pittsburgh, has developed a permanent transparent coating for glass which conducts electricity. The material is said to eliminate aircraft windshield icing and interior fogging.

Mathieson Alkali Works, New York, has entered the fire protection field with development of both high and low pressure carbon dioxide equipment.

Mabor Co., Rahway, N. J., has been organized to manufacture degreasing equipment, metal washing machines, driers and burners.

General Electric Co., Schenectady, N. Y., has announced that tests on silicone oil for airplanes will be conducted by a large aircraft company at the request of the safety bureau of the Civil Aeronautics Board. The oil is considered to be much less inflammable than petroleum oil.

Wallace Supplies Mfg. Co., Chicago, has organized Wallace Tube Co. as a wholly owned subsidiary for distribution of industrial tubing and fittings.

Reynolds Metals Co., Richmond, Va., has signed a co-operative agreement with Benson Mfg. Co., Kansas City, Mo., whereby Reynolds will furnish a continuous supply of aluminum for the manufacture of the latter company's aluminum beer barrels and will handle sales distribution of the barrels.

Dilley Mfg. Co., Cleveland, has moved to a larger plant at 1656 Ansel Rd., Cleveland 6.

B. F. Goodrich Chemical Co., Cleveland, has acquired the government-owned

synthetic rubber plant in Louisville and will convert part of the facility to production of polyvinyl resins.

Heil Engineering Co., Cleveland, has been incorporated and renamed Heil Progress Equipment Corp.

Fonda Gage Co., Stamford, Conn., has appointed A. C. Wickman (Canada) Ltd., New Toronto, Ont., as sole Canadian representative for its line of gage blocks.

Cal-Therm Industries Inc., Chicago, has acquired Fred W. Gehrer Co., Chicago, manufacturer of metal spun specialties.

Pennsylvania Salt Mfg. Co., Philadelphia, has purchased the Kentucky Babb Fluorspar mine near Salem, Ky., from Kentucky Fluorspar Co., Marion, Ky.

Sentry Co., Foxboro, Mass., has appointed the following as district representatives: McQuiston & Gibson, Pittsburgh, for western Pennsylvania; Landes, Zachary & Peterson, Denver, for Utah, Wyoming, Colorado, New Mexico, Nebraska, Kansas except Kansas City, and Oklahoma; and Tenney Combustion Engineering, Dayton, O., for southwestern Ohio.

Allis-Chalmers Mfg. Co., Milwaukee,

has established three testing laboratories for industrial and marine products. The facilities include a "shock-test" laboratory, an electronic processing laboratory and a steam turbine auxiliary test floor.

Cheston L. Eshelman Co., Baltimore, has begun production of a low wing monoplane, named the "Winglet." Sheet metal work is being done by Wolfe & Mann Mfg. Co., Baltimore. The company has orders for more than 700 planes, it is said.

Island Equipment Corp., New York, has acquired an additional plant in Hollis, Long Island, adjacent to its No. 1 plant. The acquisition will enlarge the company's capacity for roller gravity equipment.

Hyster Co., Portland, Ore., has begun operations in its new plant at Danville, Ill. The new plant, manufacturing lift trucks, is expected to be in full production by fall.

Electric Storage Battery Buys Stokes Rubber Co.

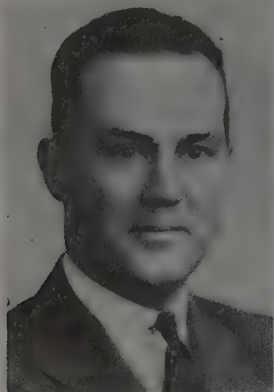
Electric Storage Battery Co., Philadelphia, has purchased the business and property of Joseph Stokes Rubber Co., Trenton, N. J., from Thermoid Co., Trenton, according to S. W. Rolph, executive vice president of Electric Storage Battery.

The rubber company which manufactures hard rubber and bakelite products for the storage battery, chemical, photographic and x-ray industries employs approximately 600 persons.



"ON THE JOB" TRAINING: School is in session at Heil Co., Milwaukee, for 20 veterans who have been selected for an extensive course of from 18 months to four years in preparation for supervisory positions. Training schedules include machine shop, engineering department and personnel work as well as classroom lectures

Men of Industry



HOWARD H. HILDRETH

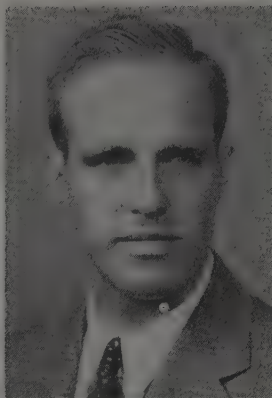
Howard H. Hildreth has been named assistant secretary, Washington Steel Corp., Washington, Pa. He joined the company in December, 1945, and until recently has been supervising the construction of the new Sendzimir cold mill. He was released from the Army last year.

W. C. Stevens has organized his own company, Stevens Mfg., Mansfield, O., to engage in the design, manufacture and sale of electrical appliances and industrial thermostats. Mr. Stevens had been with Westinghouse Electric Corp., Pittsburgh, for 21 years, and was manager of thermostat sales at the time of his resignation.

Warren R. Purcell has been named manager of quality control, Lamp Division, Sylvania Electric Products Inc., Ipswich, Mass. Mr. Purcell has been with the company since 1943, and was supervisor of quality control of new products and of incandescent lamp life testing. In his new position, he will be responsible for approving the quality of lamps to be marketed by Sylvania Electric, and for the establishment of further improved quality controls.

E. C. Hawkins has been placed in charge of the Chicago branch office of John S. Barnes Corp., Rockford, Ill. The company's hydraulic sales in the Chicago area will be under the direct supervision of Mr. Hawkins, who had been manager of the eastern sales office at Newark, N. J.

Howard Oxsen had been promoted to manager of the Seattle branch house, Fairbanks, Morse & Co., Chicago, succeeding John F. Marquitz who will be assigned new duties elsewhere. Mr. Oxsen



ASA SHIVERICK

joined the company in San Francisco in 1917, in the repair parts department. He was diesel engine department manager of the San Francisco branch from 1938-45. During the last few months, he had been undergoing a period of training for his new assignment.

Asa Shiverick has been appointed New York district sales manager of the clamshell and dragline bucket department, Wellman Engineering Co., Cleveland.

Warren H. Farr, vice president of the former Budd Wheel Co., has been appointed vice president in charge of manufacturing of the new Budd Co. Mr. Farr will have headquarters in Philadelphia. He will be in charge of manufacturing in the company's Detroit and Philadelphia automotive plants, and the railway car plant in Philadelphia. Mr. Farr joined Budd in 1927.

Birger G. Thele has been promoted to chief engineer, coal mines, Tennessee Coal, Iron & Railroad Co., Birmingham, Ala. For the last 6 years, Mr. Thele had been electrical engineer for the company's coal mines department. He joined TCI in 1922.

Robert H. McClintic has been named director of public relations, Koppers Co. Inc., Pittsburgh. His appointment follows the consolidation of all public relations and advertising activity of the company into a new unit to be called the public relations section. All advertising agencies serving the various divisions of the Koppers company are to work directly with the newly established section which will function as a staff section in the office of the president, Gen. Brehon Somervell. Ralph Winslow, who

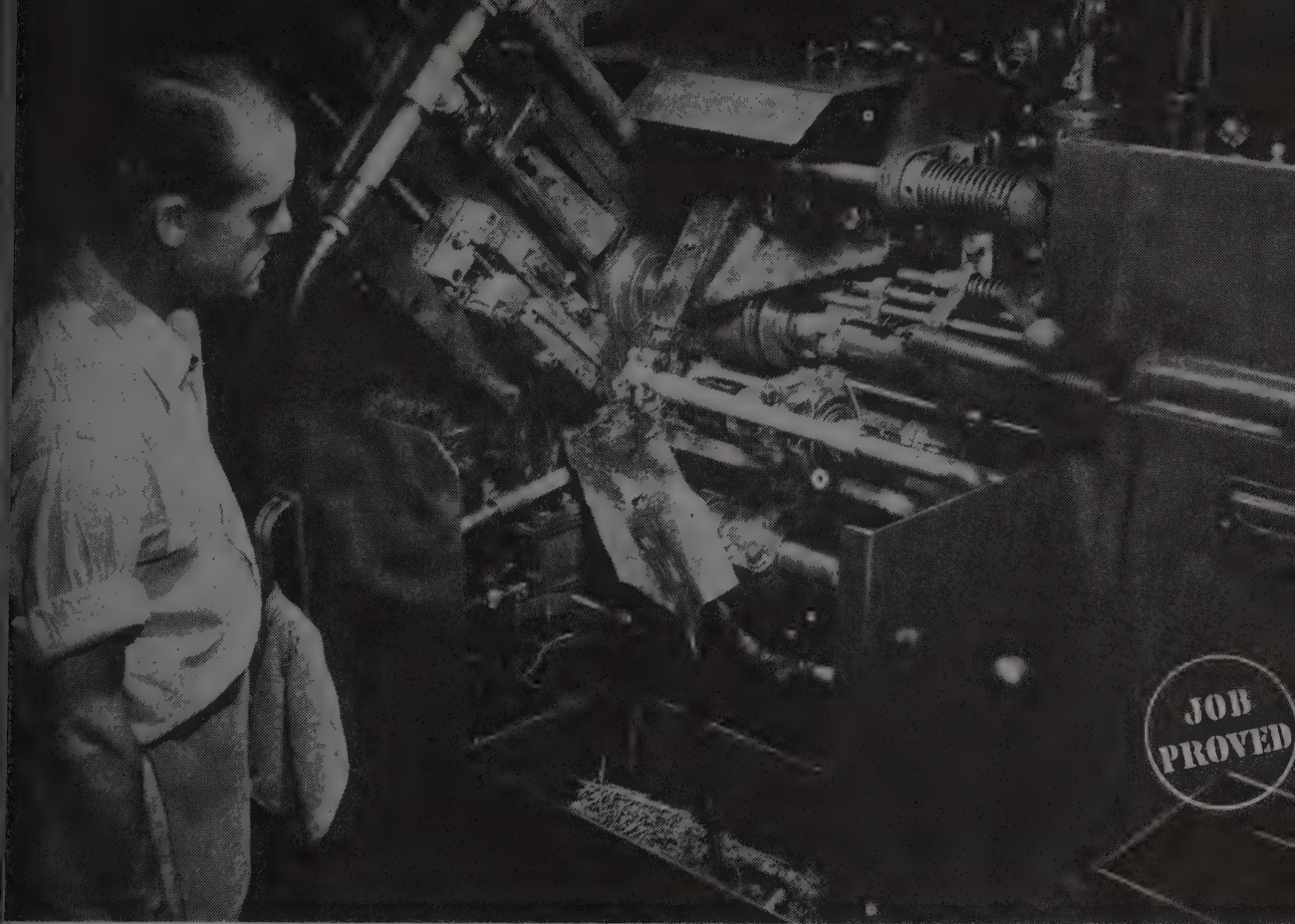


MAURICE D. BENNETT

had been advertising manager for the last year, has been named assistant director of public relations. Richard C. Carr and Norman L. Park have been appointed to the public relations staff of the company. Mr. Carr was in charge of general advertising for Westinghouse Electric Corp., Pittsburgh, and Mr. Park was manager of public relations for Rustless Iron & Steel Corp., Baltimore.

Maurice D. Bennett has been appointed superintendent of research, Stamford Division, Yale & Towne Mfg. Co., New York, succeeding the late Charles C. Leden. Fred K. Heyer will have charge of general research on locks and hardware in the research department. Mr. Bennett joined Yale & Towne in 1927 as an instructor in the Stamford Division's apprentice school. Two years later, he was transferred to the bank lock department, and in 1937 he became chief research engineer in the company's research department. He advanced through various research positions, and in 1943 was appointed superintendent of the department making hydraulic actuating cylinders for war planes. Recently he had been superintendent of the radar department. Mr. Heyer began his industrial design career with Yale & Towne's blue print department from 1904-07. Following a six-year interlude as an engine designer for various companies, he returned to Yale & Towne in 1913 in the lock design department. In 1929, he was promoted to supervisor of research.

John P. Jones has been named assistant to R. D. Becker, manager, Housewares Division, Reynolds Metals Co., Richmond, Va. Mr. Jones will handle sales and merchandising problems, and will have headquarters in Louisville.



Tapping AND Threading S.A.E. 4140 STEEL

SUNICUT...

Makes possible fast production of fine threads

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Type of Machine: New Britain Gridley automatic screw machine, 2" capacity, No. 61, six spindles.

Metal: S.A.E. 4140 bar stock.
Operation: Forming, drilling, tapping, and threading.
Speed: 85 SFPM

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PRODUCTS

Until recently, he had been in charge of housewares sales for the company in the Philadelphia area, which includes upper New York state, eastern Pennsylvania, the District of Columbia, Delaware, Maryland and New Jersey. This territory will be taken over by **John Schwartzel**. Prior to joining the Reynolds organization, Mr. Jones spent three years in the Army.

Hugo Hiemke has joined the Pacific Coast Division, A. O. Smith Corp., Milwaukee, as assistant director of the company's service and development laboratory in Los Angeles. He will work on technical problems arising in the company's west coast plant and in the plants of two subsidiary concerns, Sawyer Electrical Mfg. Co., and Smith Meter Co., both in Los Angeles. For the last year, Mr. Hiemke had been research supervisor for the war metallurgical committee of the National Research Council.

W. H. Marsh has been named general manager of the new Hydraulics Division, Rockwell Mfg. Co., Pittsburgh. The division is an outgrowth of the gun pointing program Mr. Marsh directed during the war. He joined the company in 1934, in the Pittsburgh Equitable Meter Division.

Ralph Redmond has been appointed treasurer, Redmond Co. Inc., Owosso, Mich., in addition to his regular duties as vice president in charge of purchases. Mr. Redmond started with the company in 1925. He became office manager and purchasing agent in 1933. He was appointed vice president in 1944.

A. D. Andriola has been appointed chief research engineer to head the recently announced engineering research program of De Laval Steam Turbine Co., Trenton, N. J. He will work directly

with **C. R. Waller**, vice president in charge of De Laval engineering. The new engineering research program is chiefly identified with the development of turbines, compressors, pumps and marine and aircraft units. Since 1941, Mr. Andriola had been assistant to the vice president in charge of engineering, Cramp Shipbuilding Co., Philadelphia.

Randall D. Stone has been placed in charge of the new San Francisco branch office, Oil Well Supply Co., Dallas, Tex. He had been San Joaquin Valley district manager, with offices at Bakersfield, Calif. **H. L. Freeman**, export representative of the company, also will make his headquarters at the San Francisco office.

Liquid Conditioning Corp., New York, has elected the following officers: **S. B. Applbaum**, president; **H. L. Tiger**, vice president and treasurer; **Norman L. Brice**, secretary and chief engineer; **S. S. Sulzycki**, assistant secretary and controller.

Theodore A. Cohen has announced the formation of his own company, Taco Engineering Co., Chicago. The company is a consulting, designing and manufacturing organization, specializing in electronic and electro-mechanical automatic control equipment. Mr. Cohen was founder and vice president-chief engineer of Wheelco Instruments Co., Chicago.

Floor Machinery Manufacturers Association, Rome, N. Y., elected the following officers at its recent meeting in Chicago: President, **Fred C. Hild**, president of Hild Floor Machine Co., Chicago; vice president, **Lloyd Hale**, president of G. H. Tennant Co., Minneapolis; and secretary, **R. A. Ponselle**, presi-

dent of Ponsell Floor Machine Co., New York. As president of the association, Mr. Hild succeeds **Gordon E. Kent**, president of Kent Co. Inc., Rome, N. Y., who presided from 1934 until this year.

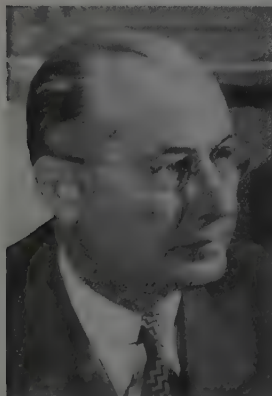
E. A. Throckmorton, president, Container Testing Laboratories, New York, Chicago and San Francisco, has been elected chairman of Packaging Institute's standing committee on trade standards and practices responsible for the packaging industry's newly initiated standardization program.

Dr. A. W. Schlechten has been appointed professor of metallurgy, Missouri School of Mines and Metallurgy, Rolla, Mo., effective Sept. 1. He will succeed **Professor H. R. Hanley**.

J. H. Stewart of Barton, Vt., has been appointed New England representative for the company's high pressure hydraulic pumps and valves, Simplex Engineering Co., Zanesville, O.

Jack A. McConnell has been appointed sales representative in the Columbus, O., territory, Automatic Transportation Co., Chicago. He will handle company sales in the city of Columbus and the surrounding territory for the office of **Arthur M. Batsner**, Automatic representative for all of southern Ohio, with headquarters in Cincinnati. Mr. McConnell was employment and personnel manager for Delco Products Division, Dayton, O., General Motors Corp., Detroit. He served in the Navy during the war.

Gus Gran has been appointed assistant sales manager, and **Ben F. Welte**, assistant chief engineer, Colonial Broach Co., Detroit. Mr. Gran, who has been with the company for the last 13 years, was assistant chief engineer, while Mr.



RALPH REDMOND



THEODORE A. COHEN



JACK A. MCCONNELL

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Pioneer Designers and Manufacturers of Outstanding Rolling Mills

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UNITED



United 100" 4-High—4-Stand Tandem Plate Mill

UNITED ENGINEERING and FOUNDRY COMPANY

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Subsidiary: Adamson United Company, Akron, Ohio

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** The World's Largest Designers and Makers of Rolls and Rolling Mill Equipment*

Welte, who joined Colonial in 1932, had been research engineer during the last several years.

—○—
Oliver R. Grace and Edward Burling Jr. have been elected to the board of directors of J. H. Williams & Co., Buffalo.

—○—
Henry H. Thomas, recently released from the Army, has been appointed to the research and development staff, Pemco Corp., Baltimore.

—○—
A. F. Hasty has been appointed sales manager, Simplex Machine Tools Division, Stokerunit Corp., Milwaukee.

—○—
Robert L. Spencer has been appointed patent attorney for Crosley Corp., Cincinnati. He replaces **Alden D. Redfield** who has accepted a position as patent counsel with Aviation Corp., New York, parent organization of Crosley Corp. Mr. Redfield has been with Crosley for 6½ years. Mr. Spencer was recently released from the Navy.

—○—
C. H. Pell has been named director of purchases, Ward LaFrance Truck Division, Elmira, N. Y., Great American Industries Inc., New York. Mr. Pell had been purchasing agent, Kaiser-Frazer Corp., Willow Run, Mich.

—○—
R. F. Wehrin has been elected president, Avion Instrument Co., New York. He had been in charge of engineering at Carl L. Norden Inc., New York. Mr. Wehrin had been assistant to Mr. Norden, the bombsight inventor, since 1936 on development and design of the Norden bombsight and related devices.

—○—
Maurice W. Reid, superintendent of the machine and tool section, Bridgeport, Conn., works, General Electric Co., Schenectady, N. Y., has been named assistant general works manager of the Bridgeport plant. He is succeeded in his former position by **Gordon F. Kelley**.

—○—
R. E. Thomas has been appointed purchasing agent, Dumore Co., Racine, Wis., succeeding G. K. Tollaksen who has resigned to enter business. Mr. Thomas has been with Dumore for two years, and was chief accountant. Prior to joining the company, he was secretary-treasurer, Indianapolis Brass & Aluminum Foundry Inc., Indianapolis.

—○—
Three new Canadian representatives have been appointed to the sales staff of Ekco Products Co. (Canada) Ltd., wholly owned subsidiary of Ekco Products Co., Chicago. **Peter R. R. Williamson**, recently released from the Canadian Army,

will serve as housewares sales representative in Montreal, covering the Province of Quebec, Prince Edward Island, Nova Scotia and New Brunswick. **John Roblin**, who has been with Ekco in Chicago since 1937, will be Ontario houseware sales representative in Toronto. He had previously worked in sales and sales promotion for the company. **Jack Lock** will be houseware sales representative for Manitoba, Saskatchewan and Alberta. The three men will work with W. B. Eakin, recently named general manager for Ekco's Canadian subsidiary. Mr. Eakin will maintain an office in Montreal.

—○—
Ralph R. Newquist has been elected vice president in charge of sales, Roots-Connorsville Blower Corp., Connorsville, Ind., one of the Dresser Industries. Mr. Newquist had been successively employed by Reliance Electric & Engineering Co., Cleveland; Louis Allis Co., Milwaukee; and Allis-Chalmers Mfg. Co., Milwaukee.

—○—
R. S. Dean is leaving government service to re-enter private business after 17 years with the Bureau of Mines, in which he rose from chief engineer, Metallurgical Division, to assistant director.

—○—
Dr. Roger Adams, head of the department of chemistry, University of Illinois, has been awarded the Priestly Medal by the American Chemical Society, New York. Dr. Adams, who is chairman of the society's board of directors, was cited for distinguished services to chemistry. The presentation will be made in Chicago on Sept. 11, at the society's 110th national meeting.

—○—
Herbert C. Petzing has been appointed manager, Cleveland branch office, Ahlberg Bearing Co., Chicago. He replaces **Max Palmer**, who recently started a bearing distributor business for himself under the name of Palmer Bearing Co. Mr. Palmer will handle Ahlberg bearings. Mr. Petzing has been with the Ahlberg company for 25 years, having served as Columbus, O., and Buffalo branch manager, and assistant manager of replacement sales in the Chicago office.

—○—
Robert C. Meyers has been appointed assistant manager, Market Development Division, sales department, Carnegie-Illinois Steel Corp., Pittsburgh, a subsidiary of United States Steel Corp., New York. Mr. Meyers, recently from the Navy, joined the sales promotion bureau of Carnegie-Illinois in 1939. The bureau, which became the Market Development Division several years ago,

develops opportunities for new uses for steel, in addition to expanding many of the older and better known uses of the product.

—○—
Robert A. Lees has been named manager of the Los Angeles plant, now being constructed, of American Anode Inc., Akron. The plant is expected to be in operation late this fall, and will manufacture latex compounds and mixes for all purposes, for sale in the area west of the Rocky Mountains. Mr. Lees joined American Anode Inc. as a chemist in 1929. He has been production manager since 1935.

—○—
Michel Biscayart has been appointed regional manager of the Foreign Division, Norton Co., Worcester, Mass. He will have charge of the distribution of all Norton products in the Netherlands, Belgium, Switzerland, Portugal and Spain. Mr. Biscayart was formerly assistant general manager of Compagnie des Meules Norton, the Norton branch factory in France, and will continue to make his headquarters in that country.

—○—
Elmer J. Klebba has been appointed traffic manager, Pontiac Motor Division, Pontiac, Mich., General Motors Corp., Detroit, succeeding **E. B. Rogers**, resigned. Mr. Klebba joined Pontiac in 1933, and had been assistant traffic manager for the last 6 years.

—○—
D. E. McGuire, assistant to the general works manager for Great Lakes Steel Corp., Ecorse, Mich., has been appointed chief engineer. He left the Trumbull Steel Co., Warren, O., in 1929 to join Great Lakes Steel as assistant chief draftsman when its Ecorse plant was still in the blueprint stage.

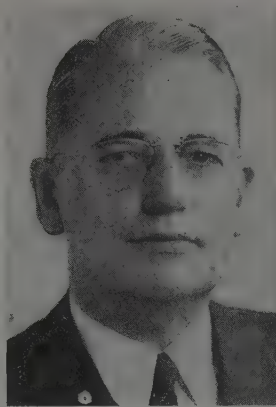
—○—
Irwin McNiece has been named assistant district superintendent of service and erection, Los Angeles district, Allis-Chalmers Mfg. Co., Milwaukee. During the last 3½ years, Mr. McNiece has been working on Allis-Chalmers marine programs in Seattle, Tacoma and Portland shipyards. He joined the company in 1912, and spent 19 of his years with the company as Allis-Chalmers representative with the Honolulu Iron Works.

—○—
Walter E. Belcher, manager, Dallas, Tex., district, New York Belting & Packing Co., Passaic, N. J., has retired after 51 years with the company. He has been succeeded by **J. E. Conaway**, who will have supervision over company sales in Texas, Louisiana, Mississippi, Arkansas, New Mexico, southeast Kansas, Oklahoma and western Tennessee. Mr.



DOUGLAS C. LYNCH

Appointed assistant general manager, Westinghouse Electric International Co., New York, noted in STEEL, Aug. 19 issue, p. 95.



ARTHUR C. WILBY

Elected vice president, United States Steel Corp. of Delaware, New York, noted in STEEL, Aug. 19 issue, p. 94.



B. A. CHAPMAN

Assistant to the vice president in charge of manufacturing, Nash-Kelvinator Corp., Detroit, noted in STEEL, Aug. 19 issue, p. 95.

Belcher was appointed to the Dallas managership in 1921. Mr. Conaway had been an assistant to Mr. Belcher. **George G. Deverall**, recently released from the Army, has been appointed sales representative of New York Belting & Packing Co. in New England, New York, New Jersey and eastern Pennsylvania. He will make his sales headquarters at the company's plant in Passaic, N. J., where he had been employed for 15 years previous to his military service.

—o—

M. D. Burns has been appointed general manufacturing manager, Radio Tube Division, Sylvania Electric Products Inc., Ipswich, Mass. He will direct the company's radio tube manufacturing operations in Pennsylvania at Emporium,

Brookville, Montoursville, Mill Hall, Johnstown, and Altoona, and at Huntington, W. Va. Mr. Burns joined the company in 1921, and served progressively as a supervisor of quality, supervisor of factory engineering, plant superintendent and plant manager. In December, 1945, he visited English radio tube plants during a study of vacuum tube manufacturing in Great Britain.

—o—

Frank W. Lorig has been appointed division engineer, Cyclone Fence Division, American Steel & Wire Co., Cleveland, subsidiary of United States Steel Corp., New York. **Charles F. Negele** has been named division engineer of appropriations and properties of the company, succeeding Mr. Lorig. Mr. Lorig's first experience with American Steel &

Wire was in 1915, when he was hired as a draftsman in the construction engineer's office. From February, 1942, to April, 1945, he was company engineer on a government project in Duluth. Since that time he held the position which he now relinquishes. Although Cyclone Fence Division's main office is in Waukegan, Ill., Mr. Lorig will remain in Cleveland on the general engineering staff. Mr. Negele joined American Steel & Wire in 1934, as a draftsman in the engineering department. Since April, 1945, he had been assistant division engineer of appropriations and properties.

—o—

W. C. Dandeno has been appointed sales engineer, Detroit territory, McInnes Steel Co., Corry, Pa.

OBITUARIES...

Stanley Motch, 69, vice president and treasurer, Motch & Merryweather Machinery Co., Cleveland, since it was organized, died Aug. 20 at his home in Shaker Heights, O. With his brother, **E. R. Motch**, and the late **George E. Merryweather**, he organized the machinery company 42 years ago. His brother is head of the firm.

—o—

Bryant Harmon Blood, retired consulting mechanical engineer, and from 1917-24 general manager, Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford, Conn., died in Stamford, Conn., Aug. 18.

—o—

R. H. Hodges, sales manager, Baltimore Division, Revere Copper & Brass Inc., New York, died recently at his home in Baltimore. Mr. Hodges began his business career in 1907 with Baltimore Copper Smelting & Rolling Co., and

when that concern became a part of Revere 18 years ago, he was assistant sales manager. He had been sales manager of the Baltimore Division of Revere since 1931.

—o—

Seymour M. Jenkins, 54, for the last 12 years an insulating brick salesman in the New York territory for Building Materials Divisions, Armstrong Cork Co., Lancaster, Pa., died recently in New York. Mr. Jenkins had been with the division since 1928.

—o—

Alfred N. Hammerston, 66, president, Hammerston Engineering Co., and Power Turbo Blower Co., both of New York, died in Wurtsboro, N. Y., Aug. 16, while on a business trip. He established the engineering companies which he headed in 1907.

—o—

Louis F. Blume, 63, retired engineer, General Electric Co., Schenectady, N. Y., and recipient of the Coffin Award

for transformer development, died recently in Pittsfield, Mass.

—o—

Robert B. Crawford, 45, vice president, Atlas Foundry Co., Detroit, and the eldest of three sons of the founder of the company, died in Detroit recently. He was at one time president of the Detroit Foundrymen's Association.

—o—

John W. Mabbs, 87, president and treasurer, Mabbs Hydraulic Packing Co., Chicago, and designer and inventor of early high-speed elevators, died recently.

—o—

Rudolph L. Sager, 47, supervisor of commercial scheduling of appliances, General Electric Co., Schenectady, N. Y., died at his home in Trumbull, Conn., Aug. 15.

—o—

Louis Bruch, 81, who retired a number of years ago as vice president, American Radiator Co., Chicago, died recently in Evanston, Ill.

In quenching and tempering gears, bolts and studs, several factors are important, principally hardness and depth of penetration. Here the author relates how hardenability testing successfully fits into one company's use of standard and alloy steels

HARDENABILITY TESTING

In Material Control

By E. H. SNYDER
Chief Metallurgist
Austin-Western Co.
Aurora, Ill.

ANY procedure involving heating and cooling a metal for changing its properties is considered a heat treatment. This includes normalizing and various types of anneals as well as quench and temper treatments. However, for obtaining the best combination of strength, wear resistance, fatigue strength and toughness in such parts as gears, bolts, studs, torsion shafts, etc., quench and tempering are usually the final heat treatment, and these are the heat treatments we have in mind for this discussion.

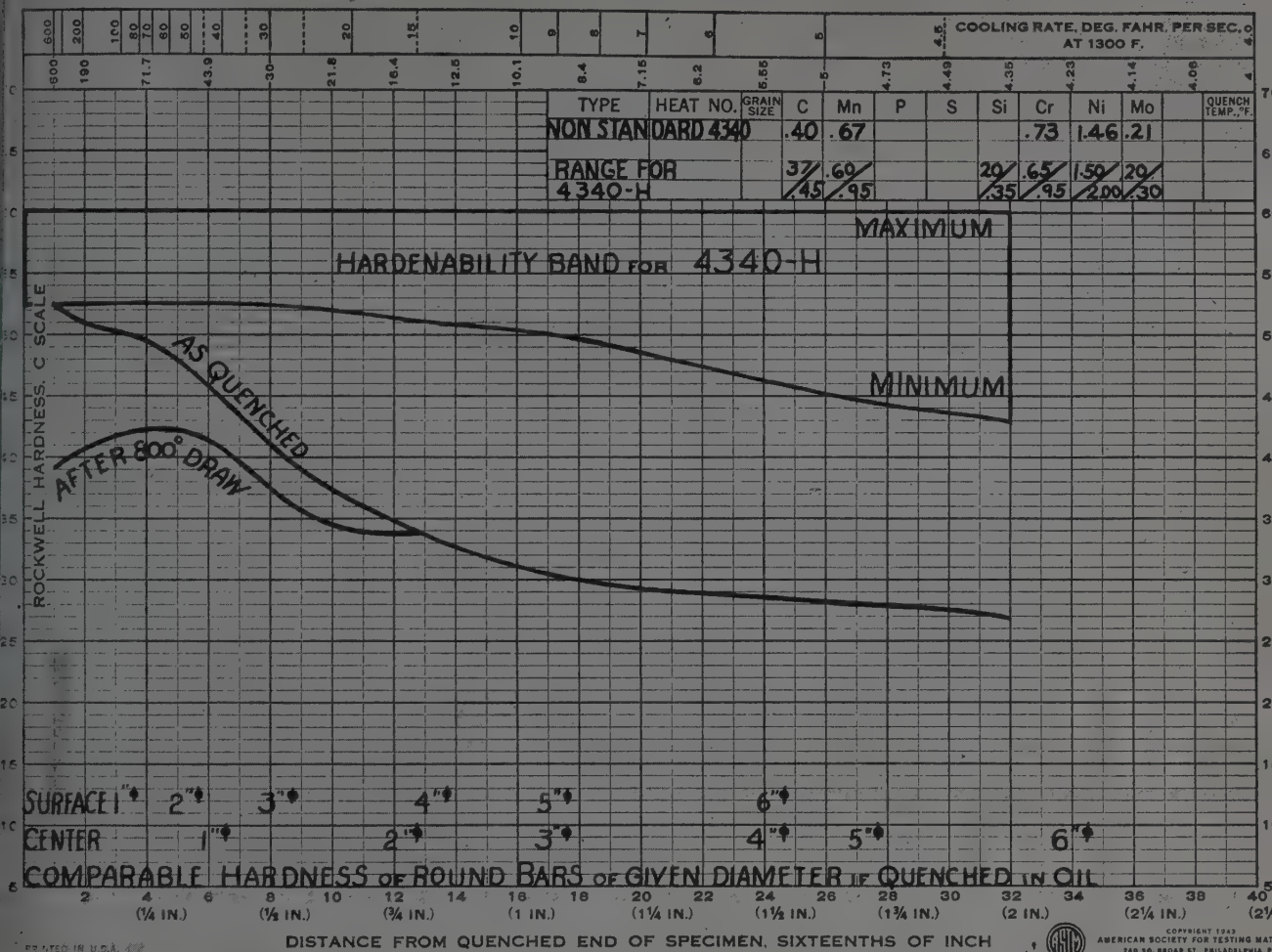
There may be tensile test or impact test or other specifications on parts being made, but for routine testing of heat treated parts hardness limits are commonly specified by the designing engineers. These hardness limits are usually expressed in brinell or rockwell C. The latter is always used for high hardness ranges, and even down between 200 and 300 brinell the rockwell is usually much more convenient and rapid, and leaves less of an imprint on the surface. Conversion charts are not 100 per cent consistent and reliable but these discrepancies are small. One point more or less is not a serious error. The serious errors are of the order of 10 points rockwell or 100 points brinell—errors, for example, which come from mixed steels and failure to quench or temper.

There is some question on how much hardness is needed for any particular part. It is probably 50 per cent true to say that no one knows very accurately. Hardness specified is likely to be the result of balancing material and machining costs, importance of weight, experience with similar parts and failures which occurred. There also is a question on what steel to specify. Here again, material and fabrication costs and previous experience enter the picture. Two other factors become increasingly important

as size of the part and specified hardness increase—attainable hardness and hardness penetration.

A hardness of 150 brinell may be obtained easily with all except the lowest carbon steel, frequently as rolled or annealed. As hardness is raised up past 200, 300, and 400 brinell, and 60 rockwell C, heat treatments become necessary, carbon must be raised to obtain the desired hardness, and alloys added or increased to obtain adequate penetration of hardness in larger sections. All metallurgists and heat-treaters who followed developments of the past generation know that as size increases more alloy must be added if deep hardening is to be obtained. Even relatively shallow hardening of larger parts becomes difficult or impractical unless alloy is added. For many applications where fatigue is the usual cause of failure, moderately deep hardening is adequate, as these failures normally start from the surface, and it is then only necessary to be sure that the surface layer is heat treated to appropriate properties. Out of some hundreds of failures from fatigue tests and from actual service, the author witnessed only one failure which started below the surface.

All failures, however, are not fatigue failures. Under exceptional loads, torque shafts do actually twist off with a single application of torque. Bolts, tie rods, studs, etc., do break in a single application of exceptional tensile or shear stress. When these failures occur with no indication of ductility—no elongation, permanent stretch, etc.—there may be grounds for believing that the material was brittle, or was low in impact properties. This type failure does occur, but so also does the type in which a single excessive force causes a ductile flow before rupture. With this type failure, deeper hardening and higher hardness



as well as larger size sections are beneficial. Larger sections increase weight, material costs and machining costs. It is, therefore, an economic advantage to use the smallest sections and highest hardness to avoid any brittle type failures.

If machining can be accomplished mainly before heat treatment, medium carbon alloy steels can be safely used at hardness levels of 388 to 444 brinell, and there is seldom any justification for a hardness level below 331-375 brinell. If major machining operations must be performed after heat treatment, there is more justification for lower hardness levels.

Both 4140 and 4340 have been widely used for some years for our axles, tie rods, torsion shafts, etc.—usually in the 388 to 444 or 331 to 375 brinell ranges mentioned above. Except for grinding, most machining operations are performed before heat treatment. Parts range from under 1 in. up to near 3 in. diameter. Forty-three forty was commonly used for the larger sizes and higher hardness and 4140 for the others. During the war use of lower alloys steels was urged or forced upon most manufacturers, unless they were manufacturing high priority material.

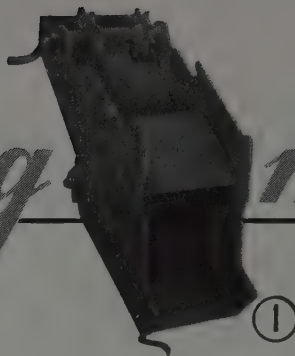
The 9400 series steels were mostly widely pushed at first. These included nickel, chromium and molybdenum as alloying elements, the same as the well known and well thought of 4300 series, except the percentage of alloys was much lower. Also, the silicon and manganese were raised above the level of most prewar steels. Some found the

Chart showing Jominy hardenability of a lot of steel purchased for 4350 with the AISI hardenability band for 4340-H steel. Curve for Jominy bar tempered at 800° F also is shown

9400 series steels a suitable substitute for the steels formerly used. Others experienced a great deal of trouble, particularly if they were heat treating relatively large parts to relatively high hardness levels. Under such circumstances, heats of steel which approached the lower limits on one or two alloying elements usually gave low or totally inadequate hardness.

Jominy hardenability testing was developed before the war, but experience with low hardenability, low alloy steels caused many manufacturers to reach for this new technique. In our own plant, Jominy hardenability testing was adopted about a year after the start of the war. This testing procedure gives quick and reliable comparisons of the heat treating qualities of each lot of steel regardless of the size purchased, or the nature of the parts for which it is to be used. SAE hardenability chart form 2 is used as the basis for determining the expected attainable hardness of various size sections from the Jominy hardenability curve. The distance on the Jominy bar having quenching rates equivalent to the surface and centers of round oil quenched bars is ordinarily put on the hardenability charts. At first these curves were put on ordinary co-ordinate paper, but more (Please turn to Page 120)

Stamping machine



With the designer becoming cost conscious in a highly competitive market, he has turned to stampings as a means of reducing costs and increasing production. These data also presented before New England members of Pressed Metal Institute

METAL stampings industry belongs to one of several groups that lately have enormously complicated the life of the machine designer. Until stampers and others such as the powder metal producers, plastics molders and die casters developed techniques and procedures to their present advanced stage, the alternative methods of making something usually narrowed down to a very simple choice. The designer would proportion the part so that it would satisfactorily perform its function on the machine, avoiding abrupt changes of section or sharp corners which he knew were detrimental, regardless of the method employed to make the part. Then he could very quickly determine—on the basis of general shape as well as strength requirements—whether to make the part a casting or a forging or whether to machine it out of bar stock. The choice of material was equally simple. If a casting, cast iron or brass; if a forging, mild steel; if bar stock, brass or mild steel. Patternmakers, molders, blacksmiths and machinists were a highly ingenious group of people that could make almost anything, and the designer did not have to be particularly conscious of the problems of the

people in the shop. Perhaps his design was a bit more expensive to make than it could have been, but in those days quantities were not so large, labor was less expensive, and the prime purpose of design was to get something that would work and keep on working.

Today all that has changed. Machines are now being made for mass consumption in highly competitive markets, labor costs have skyrocketed and the designer no longer sits in an ivory tower designing according to his personal whims. Now more than ever before he has become acutely conscious of costs and of the methods of production.

With the advent of high-speed automatic machines for turning out small machined parts, machining costs were greatly reduced and a great variety of parts could be made from bar stock provided reasonable attention was paid to ease of manufacture. However, it was recognized that for larger parts which initially were forgings or castings the partial machining required was a major expense and a production bottleneck whose elimination could spell the difference between profit and loss.

Into this picture a number of processes—some old, some relatively new—fitted perfectly. These include: Die castings, permanent mold castings, precision (investment) castings; sintered powder metal parts and stampings. The thing that these processes have in common is the fact that little or no machining is necessary before they can be assembled into the machine. For this reason they are to some extent competitive but, by the same token, they com-

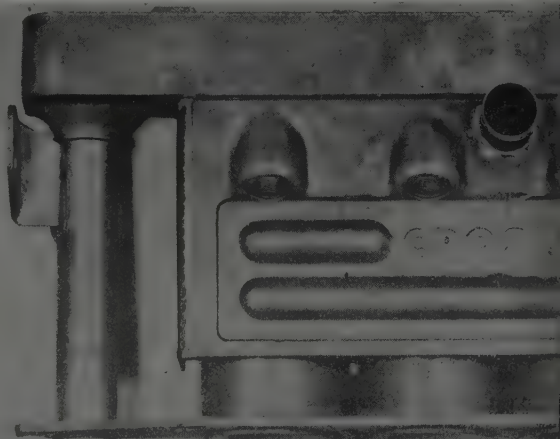
Fig. 1—This part for 50-caliber machine gun is assembled from 14 stampings

Fig. 2—(Upper view)—Assembly of brazed stampings, sized and coined. (Lower view)—Design for hub machined from forging

Fig. 3—Stampings for this welded roller on a half-track required only 25 lb of steel compared to 42 lb that were needed previously

Fig. 4—Cylinder block assembly, A and B, showing brazed stamping construction. This part weighs 14.8-lb prior to machining. Only ½-lb of metal is removed during machining. Maximum wall thickness at any point separating chamber from cooling water is 0.125-in.

A



By COLIN CARMICHAEL

Associate Editor
Machine Design

parts

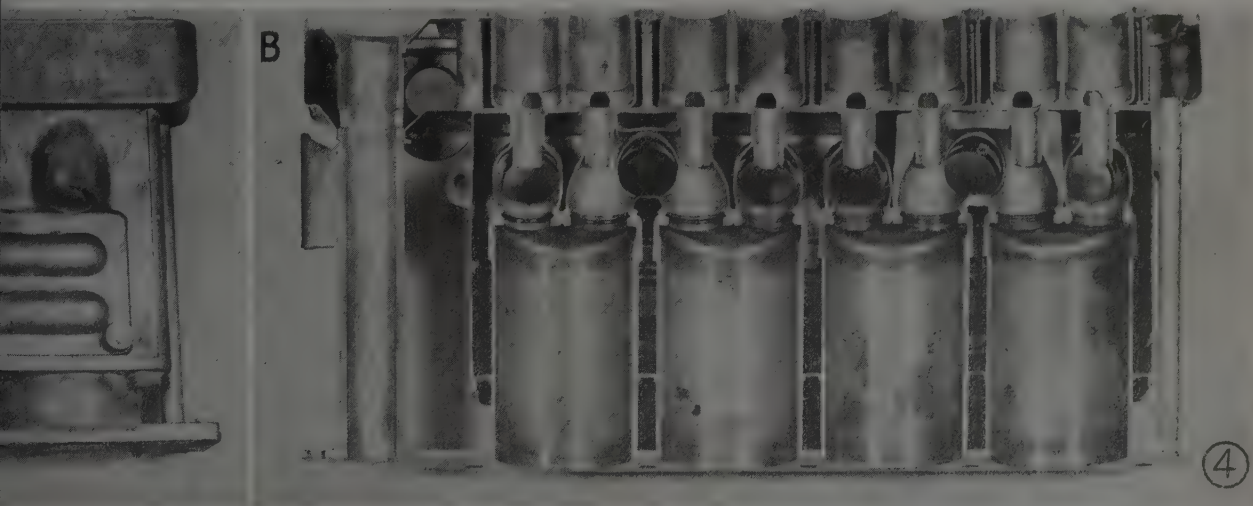
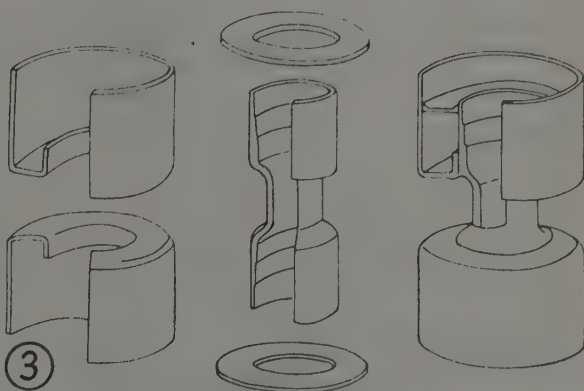
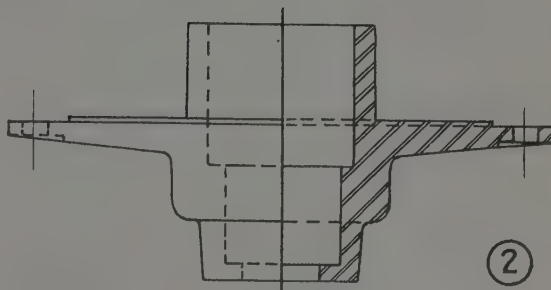
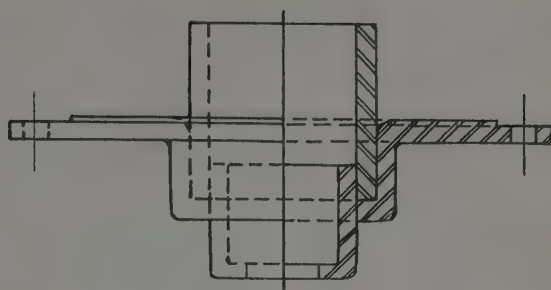
plement each other and make possible the present-day high production of many types of machines including automobiles, refrigerators, portable tools, vacuum cleaners, airplanes, kitchen mixers, etc.

It is believed that many of the new uses for stampings will involve the combining of one or more stampings with each other or with parts made by other processes. Such built-up parts, assembled by welding, brazing, press fit or other means played a big part in the development of the Ordnance Department's program for getting weapons, vehicles and ammunition into mass production, and this experience will be valuable in creating new designs to utilize stampings. Typical of these parts was the top roller for half-tracks, originally a steel casting weighing 42 lb and requiring 60 min of machining. Redesigned as an assembly of sheet metal parts weighing 25 lb, and requiring only 20 min of machining, the roller was reduced in cost from \$15 to \$6.50.

Here then is the problem facing the designer as he prepares to specify the material and manufacturing method for a new part:

Which of these methods is best suited from the standpoint of strength, stiffness, weight, corrosion resistance, ease of manufacture or availability, appearance and cost? To see what the designer's problems are, let us consider for a moment each of these necessary requirements in turn.

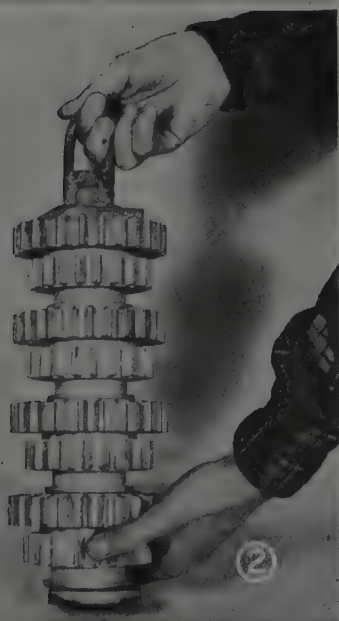
Strength, of course, means primarily resistance to failure. But what constitutes failure? (Please turn to Page 94)



Selective Carburizing

BY THE "MILL SCALE" METHOD

By ROBERT B. SEGER*
Lindberg Engineering Co.
Chicago



PREVENTION of carbon penetration of low carbon steels during carburizing is being done by several methods, some of which work exceedingly well and others of which only reasonably well. Curiously enough, a method that is at least 20 years old works as well as the best method. The method, one which proved its worth in the carburizing of bores of gears, consists of stacking gears on an ordinary hot rolled steel bolt to which a washer larger than the bore is welded, the purpose of the washer being to keep the mill scale which is placed in the lower gear from falling out. Note Fig. 1.

One of the available sources of mill scale are those plants which perform any type of forging. It is produced during the heating of the material to be forged, depending of course, upon the atmospheres used. The oxides (often undesirable) are usually released by the hammer blows. In the application illustrated it was necessary to fill the bore of the bottom gear only to approximately 1 in. in depth.

Fig. 2 shows the completed assembly, with another washer placed on the top gear and drawn relatively tight by the nut which has an eye on its end for ease in handling. It is necessary to fasten the gears together only tightly enough to prevent the mill scale from seeping out of the bore of the bottom gear. With the assembly completed, the gears are ready for either pack or gas carburizing.

Apparently the reaction which takes place during carburizing is as follows: The parts are surrounded by carbon monoxide gas and during heating at elevated temperatures, carbon has a great affinity for oxygen. It is evident that the carbon monoxide combines with the oxygen present in the mill scale compound to form carbon dioxide which is a strong decarburizing agent. Not only does the mill scale prevent carburization, but it has a tendency to decarburize the parent metal.

The area affected by the combination of mill scale and carbon monoxide gases can be seen in Fig. 3. This combination formed carbon dioxide and probably caused decarburization rather than permitted carburization.

*From "Heat Treating Hints".

Fig. 1—Ordinary hot rolled steel bolt with washer welded on end to cover gear bore

Fig. 2—Gears assembled for carburizing. Bottom gear is filled to depth of 1 in. with mill scale

Fig. 3—Pencil points to area affected by combination of mill scale and carbon monoxide gases. Resulting combination formed carbon dioxide and probably caused decarburization

FEELING MILLIONTHS: Adaptability of human beings to meet new conditions seems almost unlimited. When steam railroads originally were projected, experts predicted that crew and passengers would become insensible if speed greatly exceeded that of a trotting horse. Pioneer engineers and firemen stood on open decks so that the rush of air would keep them awake. Today we fly on airliners at 400 miles per hour. We may doze but the pilots certainly keep awake.

When I first worked in the shop, many of the older workmen claimed that they could "feel" to thousandths or less with inside and outside calipers. I know that some of them actually could—but I am not convinced that it was as effective as working with micrometers. However, when the microinch was "invented", I was sure that something new had been added which was beyond the abilities of mechanics with the super-sensitive fingers. Apparently I was wrong about that.

During the course of a visit to an aircraft parts plant, I was taken into the Superfinishing department, where finish fineness is held to limits of three or four microinches. Surface analysers are available for absolute checks, but to my amazement I found operators giving the work preliminary personal inspection by brushing a thumb nail or fingernail along the surface.

Ability to interpret the minute "phonograph needle" effect (vibrations through the nail) spells to them the difference between work of passing grade and that not so good. We live and learn!

ENGINEERING DELUXE: Last week I spent a full and revealing day in and around the engineering department of a machine tool company with whose activities I have been well acquainted for more than 30 years. Although the company itself is bigger than it was when I first became acquainted with it, the engineering department has—in proportion—grown much more than has the company as a whole. There are—I believe—between 60 and 70 people in the department.

Having heard some grumbling recently on the part of a few older machine tool men regarding the apparently top-heavy condition of engineering in their industry, I set about analysing the situation in a general way in an effort to figure out what has been going on, and why. My conclusion is that engineering hasn't gotten out of line—it simply has kept pace with its own constantly growing complications.

I have in mind a plant which in 1915 was employing 1000 men. Its more than ordinarily populous drafting room, which was not dignified by the name "engi-

Seen and Heard in the **MACHINERY FIELD**

By Guy Hubbard Machine Tool Editor

neering department", was in a rather unattractive spot next to the pattern shop. There were two chief draftsmen—one on machines, the other on tools. The machine design man had two "teams" working under him, each consisting of layout man, two detailers and one tracer.

There were five men working on tools and attachments on customers' orders. They did their own detailing and tracing. In addition, one boy worked on shop tools, primarily jigs and fixtures. He was very much under thumb of the foreman of the tool room. There was one blueprint boy. Incidentally, the drafting room as a whole was under jurisdiction of the general foreman of the plant and was not looked upon as a part of the office setup. In other words, the draftsmen were of the "flannel shirt" rather than of the "white collar" class.

Specialists Who Were Not There

More than 90 per cent of the machines were belt driven and the others were merely motorized versions of the same. There were no electrical engineers in the drafting room—that activity being one of the rather minor functions of the plant electrician. There were no hydraulic engineers for the simple reason that there were no hydraulics. There were a few pneumatic chucks but no one made that sort of thing his business.

Ordinary cast iron and soft steel straight spur gearing was the rule. No one specialized on gearing. The machines were 100 per cent plain bearing. Hence there were no ball and roller bearing specialists on the payroll. Gray iron castings and low carbon machinery steel were the principal construction materials. No one worried much about strength of materials, although the head patternmaker and the boss foundryman sometimes were called into consultation. The head blacksmith was the metallurgist but probably he did not realize that.

I could go on and on regarding the various specialists who were not on the

drafting room payroll in those days. They weren't there because the simple machines of those days didn't call for their services. The principal product of the company at that time sold for about \$1200. The comparable machine today sells for \$7500.

This \$7500 machine is better looking, more powerful, more productive, more accurate, and heavier to just about the same extent that its price is higher than that old model. It is infinitely more complicated, not by choice but of necessity. It is the sort of complication which demands not one set of drawings but several sets. It is the sort of complication that requires several varieties of thorough engineering analysis—not the old fashioned rule-of-thumb, empirical "designing" in vogue during years "Before Carbide."

Where once there was just a "set of drawings" used all along the line, there now are pattern drawings; forge shop drawings; drawings for roughing; drawings for finish machining; special drawings for outside contractors; drawings for heat treaters; electrical diagrams and drawings for prefabricated "wiring harnesses"; hydraulic layouts; lubrication system layouts; coolant system layouts; compressed air layouts; tooling layouts; and others of lesser importance. If all these layouts were superimposed the resulting tangle of lines would be beyond human understanding. Some of the individual layouts are enough to overstrain the mentality of those of us of the "tee-square and triangles" era.

And so—let me repeat—my conclusion is that modern machine tool engineering departments are not over staffed or top heavy. I will admit, however, that I had that old Rip Van Winkle feeling when I found myself in the midst of all those vertical boards and drafting machines, and computing machines and continuous blueprinters and fluorescent lights and air conditioning. Puzzling though it all was for me, I am all for it—especially the air conditioning.

HEAT TREATING

Aluminum

This is the second and concluding article devoted to a nontechnical explanation of the physical metallurgy involved during heat treating. Three articles to follow will cover recommended heat treatments and factors to be observed

By G. W. BIRDSALL
Reynolds Metals Co.
Louisville, Ky.

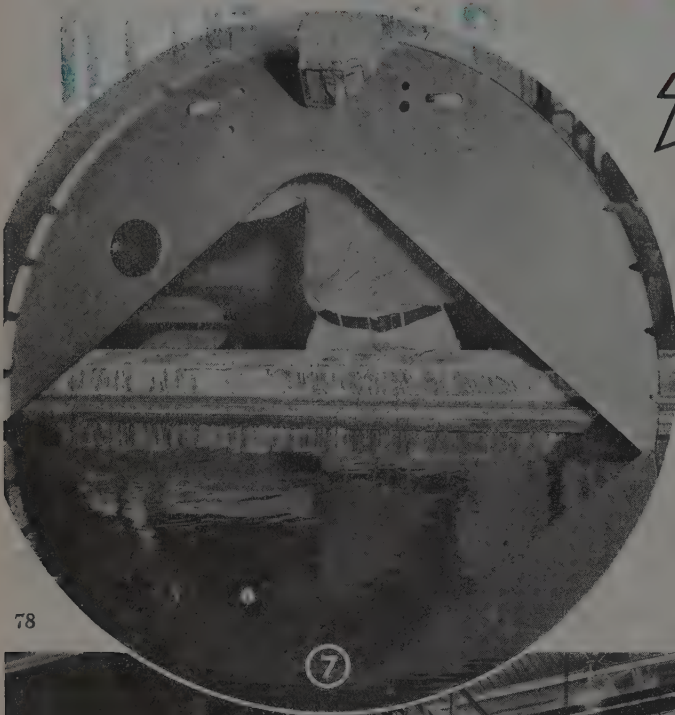


Fig. 7—Proper use of face masks and safety clothing avoids burns from splashed molten salts during heat treating in nitrate baths. Boeing Aircraft Co. photo



Fig. 8—Elevator electric furnace with water quench for heat treating aluminum alloy sheets used at Reynolds plant. View shows sheets being unloaded from rack

Fig. 9—Extruded aluminum sections 50 ft in length are here completely quenched within the 10 sec time limit. Parts are heated in a vertical type furnace with quench tank located under the furnace. Reynolds Metals Co. photo



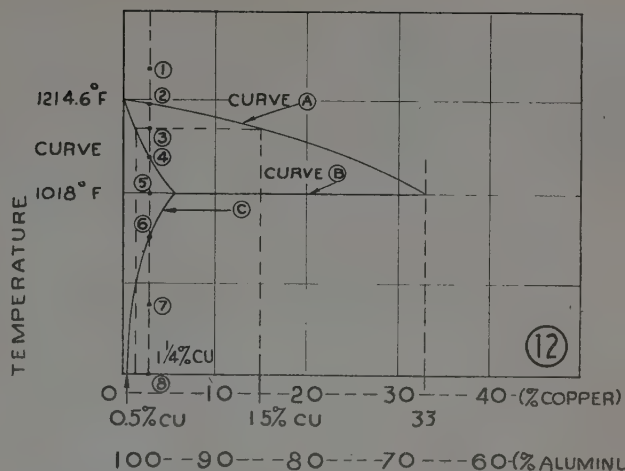
Also resistance to slippage can be increased by controlling the material that is precipitated between the crystals so that it acts like a "sharp grii" instead of like a "ball bearing". It is evident that a material that tends to aid free movement of one crystal on another will produce a softer, weaker alloy, whereas a precipitate that tends to prevent such movement will in turn produce a harder and stronger structure.

The vertical scale in Fig. 12 represents temperature, starting with room temperature at the bottom and going up above the melting point of the aluminum alloys. Since the alloys we are going to look at have aluminum and copper as the principal constituents, we can make the horizontal or base scale a double scale. Going from left to right, the upper scale measures per cent of copper from zero to 40 per cent. Disregarding other constituents, we can say that remainder at any point is aluminum. So we can put in another scale immediately below the copper one reading 100-90-80-70-60 per cent aluminum for the same points designated as 0-10-20-30-40 per cent copper respectively.

Fig. 10—Rack of aluminum parts being prepared for heat treating at Bell Aircraft Corp., Buffalo

Fig. 11—Workmen use long handled hooks to place aluminum parts into molten salt bath. Water quench tank is located immediately adjacent so that heated parts can be quenched quickly. Republic Aviation Corp. photo

Fig. 12—Portion of equilibrium or constitutional diagram for copper-aluminum alloys



First the temperature of the material will be raised along the vertical dotted line to Point 1—say 1300° F. At this temperature all the material is molten and the copper has dissolved in the aluminum.

Now the material is allowed to cool to 1190° F—Point 2 lying on Curve A. This curve represents the temperature at which the molten metal starts to solidify. The first crystals that start to form here will be almost pure aluminum. These crystals will serve as the nuclei or central points around which the grains will form by solidification of other crystals as cooling continues.

Solid Solution: Now we will allow the material to cool to 1160° F—Point 3—and hold it at this temperature while we see what is happening here. Since solidification began at Point 2, the material is now partly solidified and partly molten. Because the aluminum has been crystallizing out of solution with very little copper, the content of the still molten material is increasing.

Since the information in the chart we are studying was obtained from tests upon a whole series of alloys with different compositions as indicated by the two horizontal scales, it is possible to tell exactly how much copper is contained in the aluminum-copper alloy that is solidifying out of solution and also to tell *(Please turn to Page 127)*





PERHAPS the best way to understand the properties of lime-ferritic electrode deposits is through a discussion of typical application case histories. High carbon and alloy wrought steel experiences will be reviewed

first in this discussion.

Spring steel wear plates with a carbon content between 0.90 and 1.10 per cent are used for side bearing wear plates on freight car truck bolsters. Two sets of plates $\frac{3}{8} \times 6 \times 8$ in., are welded as shown in Fig. 9. One set of welds is made in the downhand position and the other in the horizontal position. E6012 and other mild steel electrodes had to be abandoned because of cracking. Type 18-8 molybdenum stainless steel weld metal proved satisfactory although expensive. Finally HTS electrodes were chosen with good results. The estimated saving is one dollar per car, which is worthwhile when it is remembered that thousands of freight cars are built during each year.

While preheating may be eliminated with a steel of greater carbon content when using the lime-ferritic type, some jobs still require preheating. Outside of underbead cracking thought to be caused by hydrogen, the problem of martensitic heat affected zones remains. Using a 300° F preheat brake drums of alloy steel were successfully welded to manganese vanadium spiders with HTS elec-

Applications of LIM

By ORVILLE T. BARNETT

Division Engineer, Electrode Division
Metal & Thermit Corp.
New York

trodes. The steels involved had the analysis given below:

	Drum	Spider
Carbon	0.43—0.48	0.25—0.30
Manganese	0.75—1.00	1.25—1.50
Silicon	0.20—0.35	0.35—0.50
Nickel	0.40—0.70	.....
Chromium	0.40—0.80	.....
Molybdenum	0.15—0.25	.....
Vanadium .....	.....	0.08—0.13

Maintenance departments are called upon to repair parts made of a wide variety of analyses. Maintenance welders in one large steel mill are making good use of lime-ferritic type electrodes. Using preheats up to 600-800° F, they weld steels containing as much as 0.90 carbon. With medium carbon steels analyzing 0.45 carbon or less, no preheat is used. Sections 1 in. thick or under are welded completely with lime-ferritic electrodes. Thicker sections are "buttered" with HTS weld metal and the same electrodes are used for the root beads. Balance of the weld is made with E6020 electrodes.

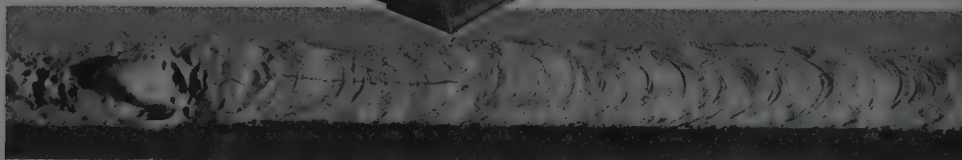
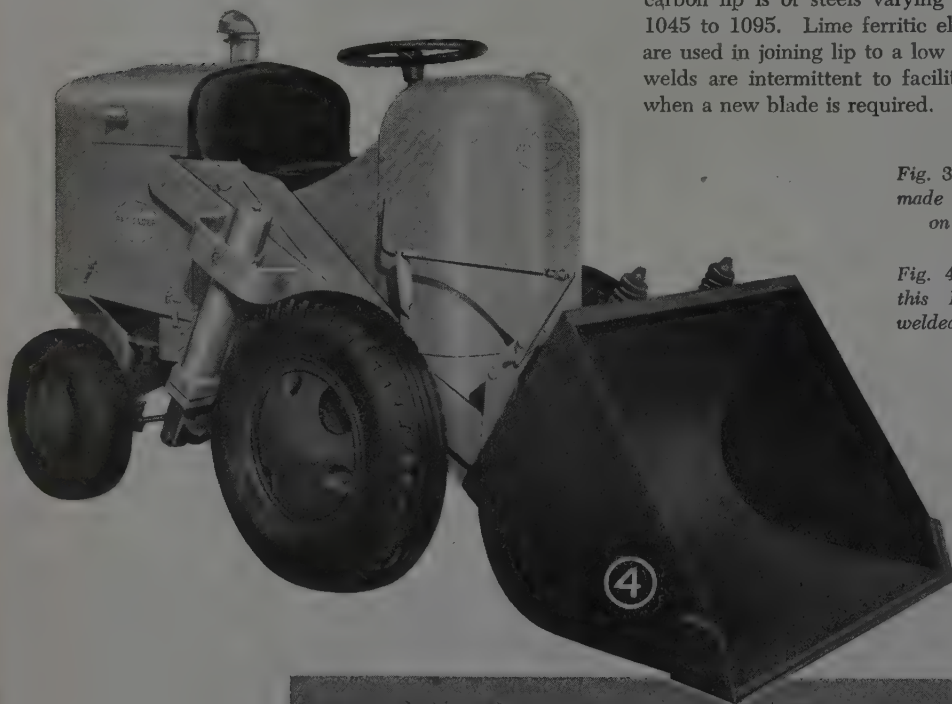
Fig. 4 shows a motor-driven power shovel. Its high carbon lip is of steels varying in composition from SAE 1045 to 1095. Lime ferritic electrodes, without preheat, are used in joining lip to a low carbon shovel body. The welds are intermittent to facilitate burning the lip loose when a new blade is required.

Fig. 3—Microsection of butt weld made with lime-ferritic electrodes on $\frac{3}{4}$ -in. high sulphur steel

Fig. 4—High carbon steel lip of this Hough power shovel was welded with lime-ferritic electrodes

Fig. 5—A porous and cracked weld resulting from use of E6012 electrode on high sulphur steel

Fig. 6—Sound weld with HTS electrode on identical steel shown in Fig. 5



FERRITIC ELECTRODES

This second of two articles discusses properties of lime-ferritic electrode deposits through typical case histories. New electrode found to extend field of weldable steels to include those heretofore classified as "difficult to weld"

One shop encountered considerable trouble with root bead cracking in spite of a 400° F preheat maintained during the fabrication of NE 8742 shafting to mild steel plate in making a single-throw crankshaft. The 3 in. NE 8742 shaft had the following analysis:

Carbon	0.40—0.45
Manganese	0.75—1.00
Silicon	0.20—0.35
Nickel	0.40—0.60
Chromium	0.40—0.60
Molybdenum	0.20—0.30

The mild steel parts were 1¼ in. thick. Lime-ferritic weld metal completely eliminated cracking.

Frequently cold-rolled steel proves troublesome during welding. After many weld failures, one company tried lime-ferritic electrodes to join cold-rolled steel bosses and studs to mild steel. The results were very satisfactory.

Ordinarily the mild steel side of stainless-clad plates is not believed to be difficult to weld. Yet, a number of field reports state that the mild steel backing of stainless-clad plates caused the weld metal to boil. Some fabricators decided to weld both the stainless and the mild steel sides with stainless steel electrodes. While such a practice was successful, it was more costly. Lime-ferritic electrodes overcame the boiling and were less expensive.

Sulphur always was "poison" to weld metal. In addition to a violent boiling in the weld pool that makes it difficult for the welder to control his deposit, sulphur produces unsightly porosity and cracked welds. Poor experiences with free machining steels in welded fabrication forced manufacturers to choose between poor weldability and less desirable machinability. With the recent introduction of lime-ferritic electrodes, the happy marriage of good weldability and machinability took place.

Before lime-ferritic electrodes became available, common practice dictated the selection of a "cold" electrode such as E6012. With the least pick-up of parent metal, the effects of sulphur could be held within bounds at times, but not always. Fig. 5 illustrates the porous and cracked weld metal encountered with an E6012 electrode

on SAE X1315 steel. Fig. 6 shows a sound weld made on the same plate with HTS. In both instances, ¾-in. sulphur bearing free-machining steel was joined with a horizontal fillet weld using 3/16-in. diameter electrodes.

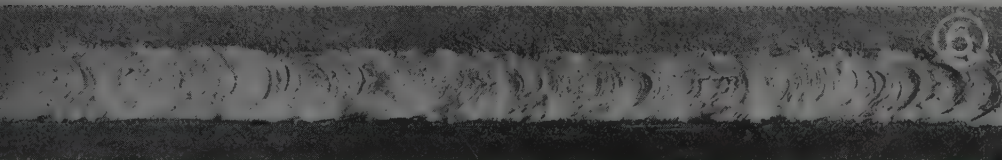
Next a butt weld was prepared to provide a plate for x-ray examination and all weld metal specimens for physical property evaluation. Fig. 3 shows a cross-section of the finished weld which proved to be x-ray clean. The plates were ¾-in. thick. Welds were made with 5/32, 3/16 and 7/32-in. electrodes. Seven layers were deposited with 12 beads. A backing strip of the same sulphur containing material was employed. The uneven contour at the root of the bead was caused by removing the backup bar prior to making the micrograph.

Both the fillet welds and the butt weld were made by a large midwestern machinery and equipment fabricator. The opening paragraph of their metallurgical department report is quoted below leaving out company names.

"With the increased desire for the use of low carbon, high sulphur, free-machining steels, there were many inquiries as to their weldability. In the past, these steels were classified as being unsatisfactory for welding with ordinary mild steel electrodes in that deposited metal was always extremely porous and oftentimes cracked down the center of the bead. However, with the introduction of a newly developed electrode, namely the lime-ferritic type, we wish to announce the subject steels now can be satisfactorily welded."

Highlights from the technical data in this report follow. In Table VII are shown the chemistry of the electrode core wire, the sulphur bearing free-machining steel and the weld metal deposited on this steel. The weld deposit contains 0.042 per cent sulphur, proving that the slag produced by the coating effectively reduces the sulphur in the weld deposit to a safe value.

Physical properties of weld deposit illustrated in Fig. 6 demonstrates quality of a butt weld between two high sulphur plates as compared with a mild steel weld deposit joining mild steel plates. For comparison, physical



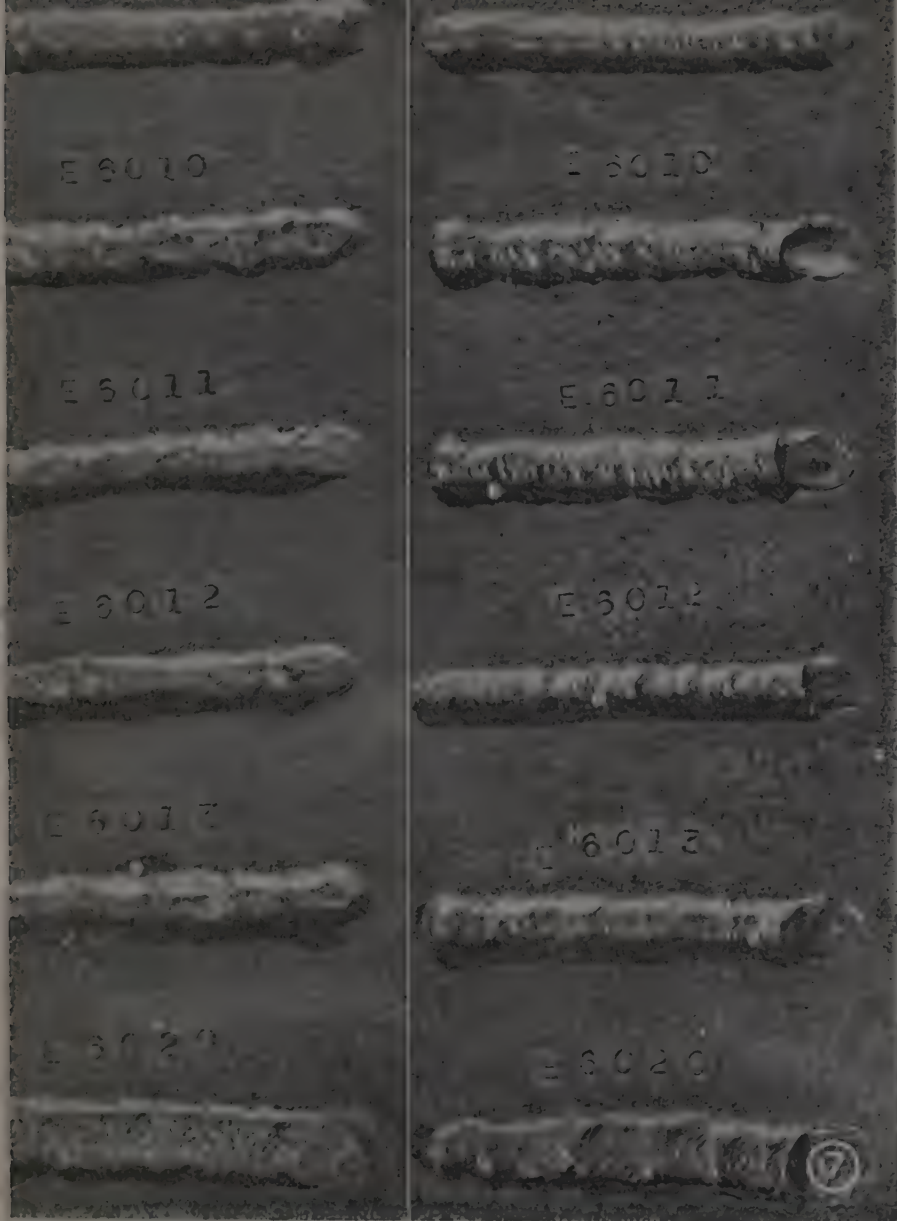
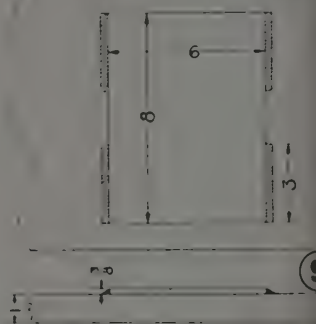


Fig. 7—Beads on high sulphur steel on left as compared with mill steel on right show that all welds except the lime-ferritic suffer from effects of sulphur

Fig. 8—Lime-ferritic electrodes were used to fabricate this tire building drum of high sulphur free-machining steel

Fig. 9—Spring steel wear plates with a carbon content between 0.90 and 1.10 per cent are welded to freight car truck bolsters with lime-ferritic electrodes as shown in diagram. One set of wells is made in down-hand position and other in horizontal position



properties of the sulphur bearing plate are also given in Table VIII. Of importance is the high impact strength reported for the lime-ferritic electrodes. A series of tests to be reported later shows high impact strength as a regular attribute of lime ferritic weld deposits.

There are a number of grades of sulphur bearing steels in common use as shown in Table IX. The low carbon grades are those with 0.25 per cent carbon or less. These may be welded with HTS without preheating, whereas the higher carbon type may require welding with type AWL where it is necessary to match physical properties. In the highest carbon types containing 0.40 per cent or more carbon, preheating is necessary.

With the higher carbon sulphur bearing steels, pre-heat temperatures of 400° F minimum will permit satisfactory welds. In the intermediate range of 0.25 to 0.40

per cent carbon, the use of preheat will depend upon section thickness and carbon content. One-half inch material will require no preheat, while greater thicknesses should be preheated to temperatures no less than 300° F but certainly to 400° F or more when the section exceeds 1 in. in thickness.

Type AWL electrodes have a lime-ferritic base coating depositing weld metal of the manganese-molybdenum type. Table X lists the chemical analysis of the deposit and Table XI shows typical physical properties.

TABLE VII

CHEMICAL PROPERTIES OF LIME-FERRITIC WELD METAL
DEPOSITED ON SULPHUR BEARING STEEL

	Electrode Core Wire	Sulphur Bearing Steel	Weld Deposit
Carbon	0.11	0.21	0.11
Manganese	0.50	1.30	0.68
Sulphur	0.027	0.279	0.042

TABLE VIII

PHYSICAL PROPERTIES OF LIME-FERRITIC WELD DEPOSIT ON
SULPHUR BEARING STEEL COMPARED WITH MILD STEEL WELD
METAL AND SULPHUR BEARING PLATE

	Lime-Ferritic Weld Deposit on Sulphur Bearing Steel	Mild Steel Weld Deposit on Mild Steel	Sulphur Bearing Free Machin- ing Steel
Yield Strength, psi	63,400	59,950	37 000
Ultimate Strength, psi	74,100	68,650	62 400
Elongation in 2", %	21.5	25.5	33.0
Reduction of Area, %	36.0	49.0	58.0
Charpy Impact Strength, ft./lbs.	48.0	27.1	31.5

TABLE IX

SULPHUR BEARING FREE-MACHINING STEEL TYPES

SAE No.	C.	Mn.	P.	S.
1112	0.08-0.16	0.60-0.90	0.09 0.13	0.10 -0.20
X1112	0.08-0.16	0.60-0.90	0.09 0.13	0.20 -0.30
1115	0.10-0.20	0.70-1.00	0.045 Max.	0.075-0.150
1120	0.15-0.25	0.60-0.90	0.045 Max.	0.075-0.150
X1314	0.10-0.20	1.00-1.30	0.045 Max.	0.075-0.150
X1315	0.10-0.20	1.30-1.60	0.045 Max.	0.075-0.150
X1330	0.25-0.35	1.35-1.65	0.045 Max.	0.075-0.150
X1335	0.30-0.40	1.35-1.65	0.045 Max.	0.075-0.150
X1340	0.35-0.45	1.35-1.65	0.045 Max.	0.075-0.150

TABLE X

CHEMICAL ANALYSIS OF TYPE AWL WELD DEPOSITS

Carbon	0.10-0.16
Manganese	1.65-1.95
Phosphorus	0.035 Max.
Sulphur	0.035 Max.
Silicon	0.20-0.50
Molybdenum	0.30-0.40

TABLE XI

PHYSICAL PROPERTIES OF WELD DEPOSIT
FROM $\frac{1}{8}$ " x 14" TYPE AWL ELECTRODES AS WELDED

Yield Strength, psi	80,000
Ultimate Strength, psi	102,500
Elongation, % in 2"	22.3
Reduction of Area, %	58.9

TABLE XII

PHYSICAL PROPERTIES OF TYPE I NICKEL STEEL CASTINGS

(Stress-Relieved Four Hours at 1150° F.)

Ultimate Strength, psi	75,000
Yield Strength, psi	48,000
Elongation, % in 2"	24
Reduction of Area, %	50

TABLE XIII

TYPE 8015Q WELD METAL PROPERTIES
AFTER STRESS RELIEVING FOR FOUR HOURS AT 1150° F.

Ultimate Strength, psi	95,000
Yield Strength, psi	83,500
Elongation, % in 2"	25.0
Reduction of Area, %	78.1

TABLE XIV

CHEMICAL ANALYSIS, PHYSICAL PROPERTIES AND HEAT TREAT-
MENT SELECTED FOR MINOR AND MAJOR REPAIRS OF
CARBON STEEL CASTINGS

Type of Repair Material or Electrode Type	None Casting	Minor 7015B	Major 2115
CHEMISTRY			
Carbon	0.25	0.10	0.12
Manganese	0.72	0.52	0.68
Phosphorus	0.010	0.019	0.017
Sulphur	0.026	0.031	0.030
Silicon	0.42	0.22	0.22
Chromium			0.90
Molybdenum		0.40	0.45

PHYSICAL PROPERTIES

	Heat Treated	As Welded	Heat Treated
Yield Strength, psi	46,500	63,000	51,500
Tensile Strength, psi	76,700	73,400	76,000
Elongation, % in 2"	21.5	25.5	31.0
Reduction of Area, %	31.5	45.5	64.6

HEAT TREATMENT

Normalize at °F.	1650	None	1650
Hold, hours	2		2
Cool in	Air		Air
Temper at °F.			1150
Hold, hours			2
Cool in			Air

TABLE XV

CHEMICAL ANALYSES, PHYSICAL PROPERTIES AND
HEAT TREATMENT FOR CAST AXLE HOUSINGS

CHEMISTRY

	Casting	Weld Deposit
Carbon	.29	.12
Manganese	1.02	1.65
Chromium	.52	
Molybdenum		.41

PHYSICAL PROPERTIES

Ultimate Strength, psi	111,000	106,500
Yield Strength, psi	89,000	97,500
Elongation, % in 2"	18	17
Reduction of Area, %	43	42

HEAT TREATMENT

Heat to °F.	1600	1600
Hold, hours per inch thickness	1	1
Quench	Water	Water
Temper at °F.	1150	1150
Hold, hours per inch thickness	1½	1½

Higher carbon and manganese along with molybdenum furnish the high strength while the lime coating makes the electrode suitable for sulphur bearing steels. Type AWL was applied to heat treated free-machining steels with one steel producer outlining the following rules for welding 0.40 per cent carbon heat treated free-machining steels:

1. Electric welding is almost a necessity, first to limit the extremely heated zone to the smallest possible extent and second because gas welding will almost invariably be porous in high sulphur steels.

2. It is recommended the current be somewhat lower than average . . . use lowest amperage consistent with good welding.

3. Preheat is definitely desirable. A temperature of 400°-450° F is recommended. This is also desirable for

any of the 0.40 to 0.50 carbon steels.

4. Preheat for bessemer screw stock, like other low carbon steels, is not necessary.

5. Keep penetration at a minimum. The deeper the penetration, the more pick-up of parent metal and consequently the more dilution of the weld metal.

6. Cool normally in air. . .

Mechanical molds and other equipment used in the rubber industry call for appreciable machining. Sulphur bearing steels and welded fabrication proved to be a worthwhile combination. Fig. 8 shows a tire building drum welded with lime-ferritic electrodes. Where treated designs were changed, it was found practical to blank out unneeded portions by filling the old design with weld metal.

Another attribute of lime-ferritic weld deposits that at-

tracted rubber industry was ability of weld metal to take polish like that of original mold material. In one instance, a polish comparable to that of No. 8 on stainless steel was applied to both the base metal of the mold and the weld metal. Hot water bottles were processed in these molds. The report stated that this was the first time a highly finished article had been processed in a welded mold without disclosing the location of the weld patch on the surface of the molded rubber product.

Cribs for wet mixing machines were designed and built of high sulphur free-machining steel. The designer did not suspect welding troubles might be encountered. Both E6012 and E6013 electrodes were tried without success. The manufacturer was faced with scrapping valuable material on which considerable work had been expended. When lime-ferritic electrodes did the job, his feeling of relief was most understandable.

Another job requiring the production of a restricted box section of 1 in. plate welded to a 3 in. base of high sulphur steel was fabricated by block welding with the new electrode type.

Free machining hot platens for presses were successfully built with this electrode type where other deposits had cracked and leaked steam. Plate thicknesses of 2 in. and more were involved.

Resistance welding machine parts requiring considerable machine work to at-

tain the high quality finish required for equipment of this type were welded with lime ferritic electrodes. The manufacturer was well pleased with the overall machining operation which did not reveal the weld location.

Present day foundry practice shows the results of considerable research work on melting practice, foundry sands and pouring methods. As a result of this intensive work, carbon and alloy steel castings are exhibiting excellent strength and ductility properties. Heat treatment is widely employed to refine grain structures and to achieve higher strengths, both tensile and impact, along with remarkably good elongation and reduction of area values. Both x-ray and radium examination shows the high order of soundness developed in modern steel castings. And quite appropriately, lime-ferritic electrodes are being selected for casting fabrication and repair. Typical applications will demonstrate how these electrodes are being used.

One large foundry specializes in castings for railroads including steam and diesel engine frames and trucks. Nickel steel castings conform to the following chemistry:

Carbon	0.19—0.23
Manganese	0.70—0.80
Phosphorus	0.04 Max.
Sulphur	0.04 Max.
Silicon	0.60—0.70
Nickel	2.20—2.30

Physical properties following a 4 hour stress relieving at 1150° F are given in

Table XII. The typical values shown in this table demonstrate the outstanding quality of these nickel alloy castings.

Repair work is done in the vertical and overhead positions as well as the common flat position. Size and number of castings involved prohibit positioning each casting to permit downhand welding. Furthermore, the extent of each repair is usually too small to warrant the use of welding positioners. Of course the metallurgical requirements are strict necessitating the deposition of x-ray clean weld metal designed to match the chemical analysis and physical properties of the casting. Type 8015Q proved to be quite suitable for this application.

A typical analysis of weld metal from this nickel alloy lime-ferritic electrode is as follows:

Carbon	0.09
Manganese	0.80
Phosphorus	0.019
Sulphur	0.018
Silicon	0.18
Nickel	2.09
Molybdenum	0.45

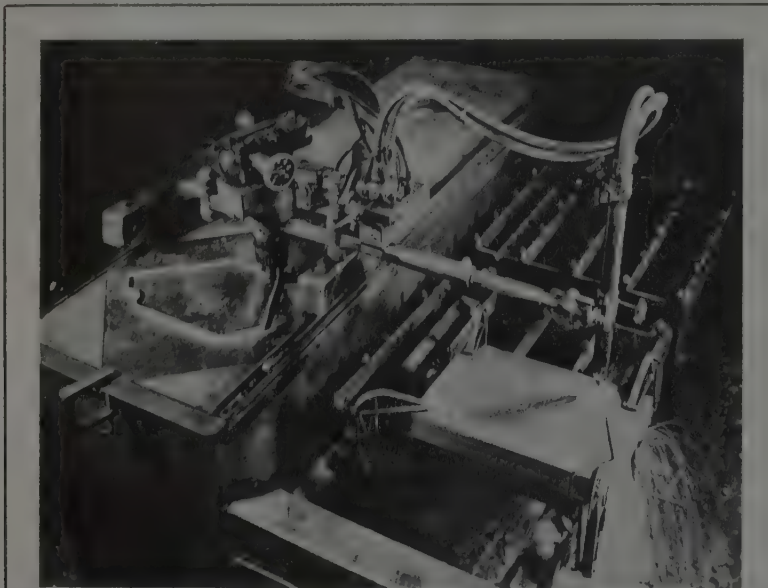
The physical properties, as listed in Table XIII, exceed those of the castings. Radiographs show that foundry welders can produce perfectly clean weld metal under production conditions.

Carbon steel castings are being normalized and drawn to bring about high strengths and good ductilities. Because of the low carbon content of weld metal deposits, alloys are used to match the strengths of these carbon steel castings. The basic lime-ferritic coating type and core wire is modified to enable the weld metal properties to match those of the heat treated castings.

One large foundry heat treats all castings before any repairs are made. If the repair is minor, the weld metal is used in the "as welded" condition. If the repair is major, a second heat treatment is used. Details of the procedure are outlined in Table XIV. Here too, x-ray cleanliness is exceedingly important to the metallurgical and inspection departments of this foundry.

With the expanding interest in chromium to retard graphitization in high temperature, high pressure power plant installations, it was only natural that type 2115 should be selected by a valve manufacturer to repair valve body castings containing 1.0 per cent chromium and 0.50 per cent molybdenum. The noticeable lack of spatter led this company's welding department to choose the unalloyed lime-ferritic type to weld wedge guides in gate valves. Cleaning costs were important, but even more desirable was the elimination of spatter from finished machined surfaces.

Another foundry found the manganese molybdenum lime-ferritic electrode suited to their needs in welding axle housings for earth moving machinery. The essential data is tabulated in Table XV.



STACK CUTTING: Fourteen pieces of 3/16-in. steel plate are shown here being flame cut at one time on this mechanized Linde Air Products Co. templet-guided setup for repeating irregular flat shapes. According to the company, a unit of Union Carbide and Carbon Co., New York, cutting speed is 7 in. per min. Standard aluminum strip templet is used to guide machine through cutting operation



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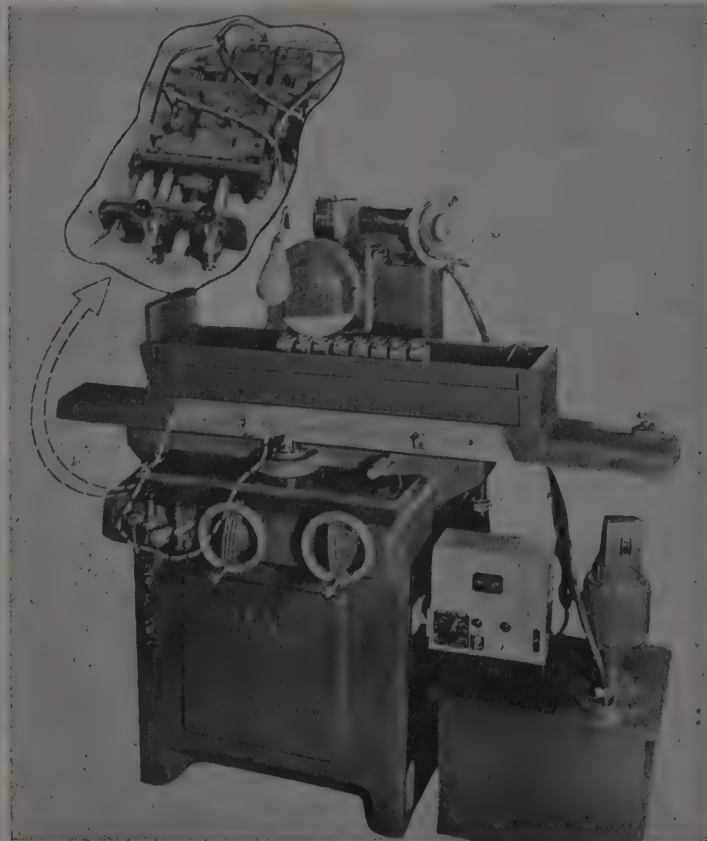
Five-way hydraulic valve with three components controls all operations of grinder with resulting increased speed and greater accuracy

A NEW hydraulic control valve has been incorporated into the DoAll G-10 surface grinder, manufactured by Continental Machines, Inc., Minneapolis, Minn., with results showing increased speed, efficiency, simplicity of operation and greater accuracy. This grinder will grind a surface to 6 microinches, it is claimed.

The new "five-in-one" valve has three components, the selector valve, crossfeed control and crossfeed directional valve. Selector valve has three positions for manual crossfeed, automatic crossfeed and rapid traverse for wheel dressing.

Crossfeed control valve is used to control the amount of crossfeed or indexing at each table reversal when using automatic crossfeed. It can be controlled to feed from 0.004 to 0.200-in.

The crossfeed directional valve controls direction of crossfeed in automatic position. A neutral position is used to stop work locating, or to use manual crossfeed as a bypass. Crossfeed can be set for any amount of travel.



Here gas-free metal was required for appearance after machining.

Metallic arc welded fabrication was abandoned by some enameling plants because the enamel chipped away from the weld metal. Hydrogen evolution was believed to have taken place during the firing of the enamel coating. Recently a company manufacturing bathtubs tried lime-ferritic electrodes although they were quite skeptical. The resulting enamelware proved to be quite satisfactory.

Glass lined tanks were plagued with the same troubles. Repairs to the lining where the glass had chipped off over the welds had to be attempted as many as three and four times before successful patches could be completed. The absence of spalled glass linings with lime-ferritic electrodes turned out to be the answer to an expensive production trouble.

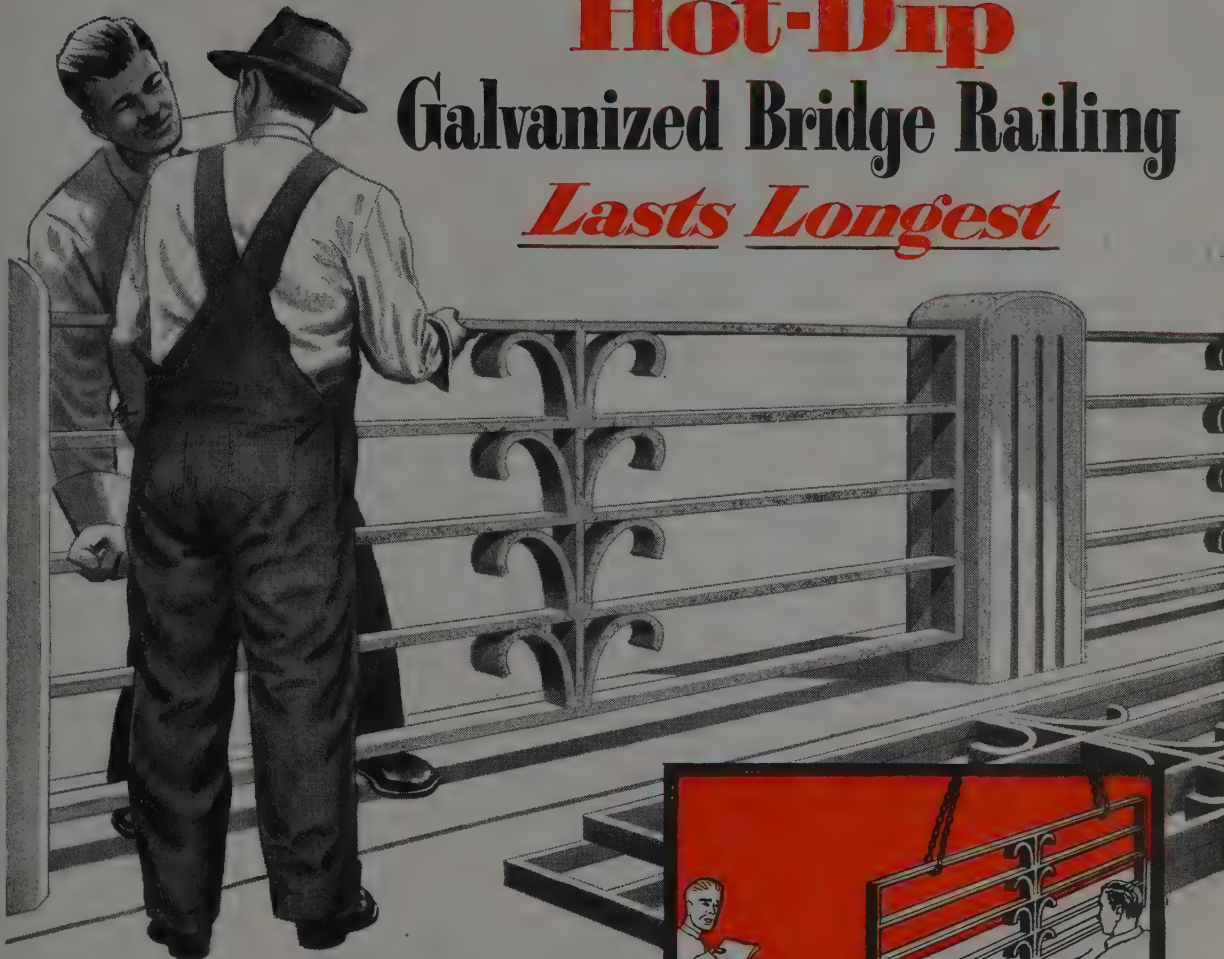
Although cast iron welding was not originally considered a field for the lime-ferritic electrodes, reports of successful applications have been received. A cast Meehanite header valued at \$2000 was salvaged by welding with IITS. A sand hole caused the drill to deviate from the center line when drilling a boss. The casting was repaired by welding and the boss was drilled in the proper location.

Welding Malleable Cast Iron

Malleable cast iron was welded with lime-ferritic electrodes without preheating on a job where a standard cast iron electrode with a 300° F preheat left un-machinable hard spots. The welding procedure was designed so as not to overheat the malleable castings. The welds, heat affected zones and parent metal could be drilled without difficulty.

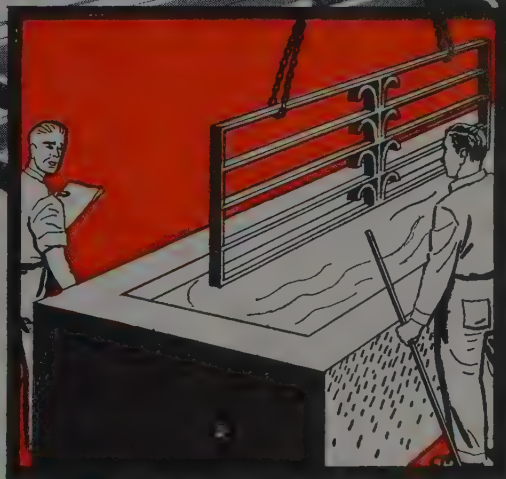
Experience shows that lime-ferritic electrodes, both carbon and alloy steel varieties, will do a great deal to improve quality welding. High carbon steels become much more readily welded. High sulphur free-machining steels, illustrated in Fig. 7, can be welded, permitting equipment builders to combine the advantages of extremely good machinability with welded fabrication. Steel foundries have a new repair electrode that yields weld metal of a quality every bit as good as quality castings. Enamellers benefit from continuous linings unspoiled by hydrogen blisters. Cast iron welding can be more easily accomplished. Maintenance and repair departments find lime-ferritic electrodes a big help when the analysis of the steel part to be fixed is unknown. And some fabricators of very heavy equipment where welding stresses caused cracked welds learned to rely on the unusually good ductility of lime-ferritic weld deposits for their most critical welds.

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ENGINEERING NEWS

at a glance

WITH combined total of 65 years experience in various phases of hard chromium plating, ten employees, together with some outside investors, purchased the entire stock of Master Chrome Service Inc., Cleveland. One of the oldest and largest companies engaged in hard chromium plating, the company has active representation throughout Ohio and the Middle West.

BELIEVED the first compilation of its kind, a brochure containing a complete set of tables showing factoring of specimen tests for every material is being offered on request by W. C. Dillon & Co. Inc., Chicago. The charts represent weeks of patient calculation by experienced engineers. Through their use, it is reported, an operator will find that specimens with pressures per square inch all the way up to 200,000 lb can be tested quickly by using reduced area specimens.

METHOD of processing high speed steel rounds in diameters greater than 5 in. was announced recently by Jessop Steel Co., Washington, Pa., in collaboration with Barium Steel & Forge Co. Inc. of Canton, O. Called Vee-Ognizing the process assures a uniform carbide distribution throughout high speed steel, and eliminates the brittle carbide pattern found in large rounds processed by conventional methods.

IN a single brazing operation, light-walled alloy steel tubes and deep drawn steel stampings—over 120 in all—are brazed together in a roller hearth brazing furnace to form the Crosley engine block weighing only 14.8 lb, it was learned recently from Lindberg Engineering Co., Chicago. Completed engine block assemblies—four to a tray—are charged automatically into the continuous furnace. The work, which at all times is protected by the Hyen atmosphere against scaling or decarburization, first enters a preheating zone, then brazing

chamber, where actual brazing takes place at 2060° F. From there, the blocks go to a slow cooling zone which reduces the temperature to about 1500° F. There Hyen Hydrying atmosphere is forced over and through each block by fans. This quenches the cylinders and valve seats to obtain necessary hardness. Block is finally cooled to about 200° F in the Hyen air to prevent scaling. Process of assembling and hardening was invented by Powell Crosely Jr., and Lindberg engineers worked out the furnace to permit quantity production.

NINE features desirable in heavy-duty industrial floors and nine benefits in trucking performance derived directly from these features including faster movement of goods, enhanced employee safety and lower handling cost are pointed out by Walter Maguire Co. Inc., New York, in literature embodying test data on the use of 100 per cent emery aggregate for flooring. Installations cited in the bulletin range from flooring in metal-working plants, where heavy steel skids and steel-wheeled trucks are operated on Emeri-Crete floors, to dairy installations where wet floors and acid reactions complicate maintenance.

ESTABLISHMENT of both engineering and manufacturing facilities for designing and producing standard and special industrial heater and resistor units is announced by the recently formed St. Clair Electric Products Co., St. Clair, Mich. Among typical products which the company is equipped to design and produce at the outset are thermal control units, viscosity control units, voltage regulator resistors, igniter coils and strip heaters. Production can be scheduled for both experimental and high volume runs. At present, additional manufacturing equipment is being installed in the company's plant—a portion of the Marysville magnesium plant formerly operated by Dow Chemical—to permit production

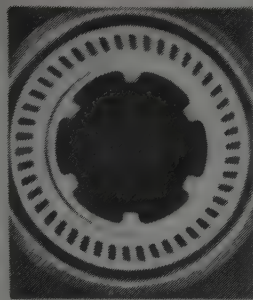
of a line of standard replacement heating units for domestic electrical appliances.

FIRST peacetime application of the war-born packaged electric power plant was disclosed recently by William E. Knox, vice president, Westinghouse Electric International Co., who revealed that a 5000 kw plant is being installed in Barranquilla, Colombia. Big brother of the war-time packaged plant, this unit contains all necessary parts of a power station, including steam generating unit, turbine generator, pumps, piping, wiring and other essentials. Plant was engineered for Westinghouse by Ebasco Services Inc.

AN alloy of 37½ per cent gold and 62½ per cent copper, useful as solder in vacuum tube construction is described in a report now available from the Department of Commerce, Washington. It states the melting range of the solder — 950 to 990° C—is intermediate between that of copper and silver-copper eutectic. Twenty vacuum joints, including copper to steel, copper to fernico and copper to copper, were made with the solder without leaks or mechanical failures. According to the report, when fernico is soldered to copper, then sealed to glass, the solder joint may get quite hot during the sealing. High melting point of the new solder is an advantage in this case.

PLASTIC sheeting ranging from 0.005 to 0.020-in. in thickness are folded into a U-type 180 degree fold, with sides brought together tightly, by means of a machine being produced by Plastics Equipment Division of Taber Instrument Corp., North Tonawanda, N. Y. By utilizing thermostatically-controlled heat, the unit actually molds the sheeting into the particular fold desired without tearing or cracking it. According to the company, the machine enables an average operator to turn out about 700 "formed folds" per hour.

AMONG recent patents registered in Washington is a new type lifting jack and a flexible joint. The lifting jack, developed by Achille Kais of Detroit, is operated by a vertically swinging lever balanced by its forked end which straddles rack bar and load head, providing a more direct lift and preventing twisting of jack. During upward movement, weight of load is supported by lifting pawl which moves by spring pressure over teeth of rack bar and into recess. The flexible joint, invented by O'Connell H. Dashields of Philadelphia, is designed so one of the members may have both longitudinal and rotational movement with respect to one



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another. It has special application in pressing machines or the like. The elements have freedom of movement without danger of leakage, and the joint does not require frequent packing. A spring included in the joint serves to compress the packing at all times.

EDUCATIONAL in nature, a booklet due to be published soon by Liquid Plastics Division of Ferro Enamel Corp., Cleveland, discusses the metal preparation of organic finishing, importance of metal preparation, control of organic finishing materials and application, accelerated testing of organic coatings and selection of organic coatings for product finishes. Entitled "Review of Product Finishing with Organic Coatings", the publication is scheduled to be distributed gratis to companies requesting it.

PARTICULARLY adaptable for use as connecting rod and main bearings in heavy and light diesel engines, a grid bearing recently placed in production by P. R. Mallory & Co. Inc. at Indianapolis, combines good surface properties and good embedability with high strength and fatigue resistance. Although this type bearing was not developed soon enough to be used extensively during the war, one of its most striking applications was in a small radial aircraft engine adapted for use in tanks. As designed, the engine

operated satisfactorily in aircraft, but when used in tanks, due to the great quantities of dirt and sand which entered the engine, the bearings wore so much in a few hundred hours that they had to be replaced. Installation of silver grid bearings in the engines increased the bearing life to such an extent that in many cases the bearings outlasted the machine.

IN New York, it was learned, a section of the two-reel film on "Splitting the Atom" made in the Philips Research lab in Holland during the German occupation is appearing in the new March of Time film, "Atomic Power" released recently. The Dutch atom film which was practically produced under the noses of the Nazis, was brought over to the New York office of the company after the war. At the time it was being made, the laboratory staff had no way of knowing of the work being done on the atom in this country.

PAIRS of strip flush-with-the-floor conveyors appearing more like a traveling track, and currently manufactured by Chain Belt Co. of Milwaukee, may be one of the factors to alleviate the shortage of autos. Quite a contrast to the former method used to haul cars down the production line—that of using a chain that protruded from the floor—

the new system supports the automobiles on its many 12-in. plates traveling along the floor in a continuous line. Projections which formerly imperiled workers are eliminated and cars can be easily removed anywhere along the line by inspectors without the use of a crane. Mechanism of the equipment such as outboard rollers for the plates, motors etc., is all concealed. One auto maker just recently completed installation of the system and expects to step up its production to 400 cars daily. Conveyors installed in this plant are approximately 346 ft long.

BEARING surface of the carbide is increased in a new punch and compacting die combination now being furnished by Penn Carbide Alloy Casting Co., Canonsburg, Pa. Design of the combination is said to increase production and reduce die inventories in powder metallurgical industries. Die is of conventional tungsten carbide type using a heat treated steel case shrunk around an insert. Punch is produced with a dove-tailed insert which is locked into the shank for added protection during operation. Design of the latter also eliminates possibility of misalignment caused by the braze taking a set when under pressure.

IN pointing out advantages of departmentalizing air compressor systems, Kellogg Division, American Brake Shoe Co., Rochester, N. Y., reveals greater flexibility is gained by spotting individual air compressors wherever they are needed instead of depending on a central source. Breakdowns, loss of air through pipe friction, production of pressure beyond actual requirements, cost of idling time of central compressors are eliminated in decentralizing — factors which, combined or singly, affect the whole plant instead of just one department.

BECAUSE organic solvent vapors may be both a health and fire hazard, solvent-using operations should be controlled carefully so the concentration of vapor in the air is kept to a minimum. The sense of smell can be a helpful safety aid in such operations, but odors may not be noticed by men very accustomed to them. Sometimes other odors may mask the solvent vapor; also an atmosphere in which the solvent odor is only barely perceptible may still be unsafe. Therefore, Safety Research Institute Inc. of New York, recommends that a competent chemist be employed to make a periodic analysis of the workroom air at breathing level. Few solvents also can be detected by the use of continuous air sampling and mechanical recording devices.



SHEET metal up to 16-gage may be crimped either at the bench or on the job by means of the device illustrated above perfected by Frank Lucarelli, tool designer for Glenn L. Martin Co., Baltimore. Metal is crimped by two round dies, one with a projecting edge and the other rounded to fit, held together by a spring tension and an adjustable screw to fit them for various thicknesses of metal. Turning of crank pulls the metal between the dies. Edge of the metal, held firmly against a guide, is crimped to desired shape. Tool works equally well on straight or curved edges of sheet or on the inside edges of blanked out holes

CLUTCH SAFETY DEVICE

... eliminates possibility of overload damage to automatic machinery

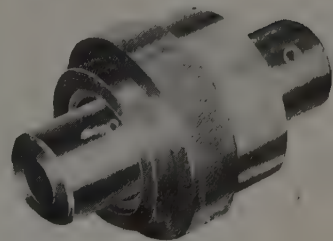
EVER present problem of overloads in the transfer of torque is said to be solved by a new clutch safety device patented recently by Otto E. Wolff, Polaroid Corp., Cambridge, Mass. Clutch brings about complete disengagement of two connected rotary machine parts through automatic introduction of a lubricant between the frictional surfaces the instant one of the parts is overloaded.

In one form, the Wolff clutch consists of a cylindrical shell attached to a hub, multiple shoes mounted on another hub so that they bear against the internal cylindrical surface of the shell, a means for controlling pressure between shoes and shell, and a lubricant within the shell.

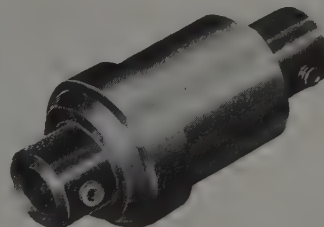
Torque is transmitted from either hub and in either direction of rotation by static friction between shoes and shell. Since the shoes are free to tilt slightly, a film of lubricant is formed between shoes and shell, resulting in substantially complete disengagement of the clutch. Fluid film is maintained and clutch remains disengaged so long as there is relative motion between shoes and shell. The instant the relative motion ceases, the film is broken and the clutch is re-engaged.

Arranged for installation in a conventional transmission, clutch can be applied to an automatic gear changing mechanism. An overrunning clutch is mounted on the countershaft. On starting, the load is carried through the overrunning clutch and gears because the automatic clutch shoes are so lightly loaded at low speeds that they will not transmit torque.

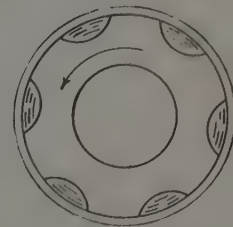
When the load is up to speed, a momentary deceleration of the driving shaft to the speed of the driven shaft will engage the clutch. The drive is now direct, overrunning the gear train through the overrunning clutch. If the load in direct drive becomes excessive the clutch disengages and the gear train again picks up the load.



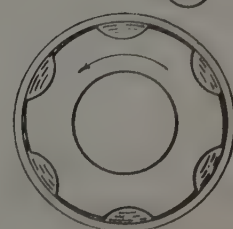
(A)



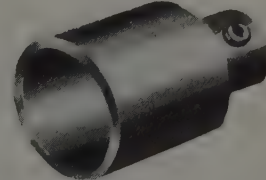
A shows two types of slip couplings with means for overload disengagement. In diagram at left, B, clutch elements are in driving position; right, overload causes film of lubricant to form between friction surfaces permitting disengagement of clutch. Coupling is disassembled in C to reveal shoes mounted on cage containing neoprene core. Core is compressed to expand shoes against shell



(B)



(C)



Slide Rules for Gage Design Copyrighted

Three new types of slide rules for gage design recently were copyrighted by employees of Frankford Arsenal Gage Laboratory, Philadelphia, and assigned to Ordnance Department. Two of these slide rules are for the design of plain gages, such as plain plugs and rings, snap gages, and adjustable length and flush pin gages.

One of the results is prepared in a cir-

cular arrangement and the other in a rectangular arrangement. The gage designer need only have component tolerance and size for determination of gage size, wear allowance and gage tolerance.

A slide rule for the design of thread gages for special threads was the third type copyrighted. This enables the gage designer to obtain from one very compact arrangement all the data necessary for the design of thread plugs, thread rings and setting plugs for national special threads.

These rules are being used at the Arsenal in the simplification of methods to improve design efficiency.

—O—

A rubber resin formulation containing no vegetable oils has been developed for use as a protective coating for concrete. Manufactured by Truscon Laboratories Inc., Detroit 12, this inert coating reportedly is resistant to all chemicals, acids and salts and will withstand the effect of rain, sunshine, alternate wetting and drying and chemical fumes.

Stamping Machine Parts

(Continued from Page 75)

Most obvious failure is actual breakage, which may occur early in the life of the part due to excessive overload or may occur later after the material has become fatigued by constant repetition of load such as might be caused by vibration. To avoid breakage the designer selects a material with good tensile strength and a high endurance limit, or he must "beef up" the sections. But resistance to breakage is not the only criterion of strength. A machine part that must co-operate with other parts in the movement of a mechanism must maintain its shape. It must not stretch, twist, buckle or bend. The very quality of ductility so much desired for deep drawing must not be permitted to manifest itself in service. High yield point material is therefore necessary or the sections again must be beefed up. At high temperature distortion may occur at relatively lower loads and the material may creep. But some degree of ductility is necessary to provide resistance to shock or impact. Absence of ductility means brittleness. The desired combination therefore is high yield point and adequate per cent elongation. Thus at least five properties of the material necessarily must enter into the designer's calculations: Tensile strength, yield point, endurance limit, creep resistance, and impact strength.

Another aspect of distortion is the possible presence of locked-up stresses due to the method of manufacture. Removal of locked-up stress by heat-treating or subsequent machining causes distortion.

Stiffness or rigidity is the resistance to

temporary deformation under load—it is the property responsible for "springback". Machine parts must not deform even temporarily to the point where moving members may stick. The property defining stiffness is modulus of elasticity. The modulus for steel is two or three times higher than for any other material—but is no higher for the finest grades of high alloy steel than for ordinary low-carbon deep-drawing steel. From this standpoint, therefore, steel stampings have a distinct advantage over other materials for the same thickness of the section.

Noise and Vibration Characteristics

Closely allied to stiffness are the noise and vibration characteristics of the material. Parts capable of appreciable deflection have a tendency to respond to vibrations and resonate, thus aggravating vibration and noise. Stiff parts respond to high-frequency vibration in the sound range while more flexible parts are responsive to low-frequency vibrations, hence vibration characteristics can be controlled by choice of material and by thickness of section. Also important in this connection is the tendency to sustain or damp out vibrations—as evidenced in the ringing sound when a metal is struck. Compared with steel and copper, tin and zinc damp out vibrations most effectively, while aluminum and nickel tend to sustain vibrations longer.

For many types of machines weight is an important consideration—perhaps for portability as in vacuum cleaners, kitchen mixers, portable tools, etc., or for aircraft or transportation by air. Here the choice of stampings is logical be-

cause of the general thinness of sections and the relatively high strength of steel. The least dense material does not necessarily make the lightest part if the strength isn't adequate. Kettering once startled an audience by predicting that we would see an all-steel airplane before we would see an all-aluminum automobile. But that is just what has happened. If we compare strength with weight, we find that high-strength alloy steel, aluminum alloys and magnesium alloys have close to the same ultimate strength per pound. The same is true of stiffness. On the other hand, copper and its alloys are relatively much heavier. When light weight is vital but the part is not heavily stressed, the aluminum and magnesium alloys have the edge, especially if a certain thickness of metal must be maintained. Thus, for the same section, aluminum has only one-third and magnesium less than one-fourth the weight of steel. The lighter weight materials such as aluminum and magnesium can be used to advantage to simplify design—the thicker sections permissible obviating the necessity of more complicated construction.

Another class of light weight high-strength materials is the resin-bonded glass laminate, which has a weight comparable to magnesium and a strength comparable to low carbon steel. This material can be molded in simple shapes under quite low pressure, hence does not need heavy presses. Parts made by this process can therefore be regarded as potential competition for stampings, especially for short runs, since no expensive dies are needed. On the other hand, the present cost of glass cloth—over \$1 a yard—is a factor against widespread use of such material in quantity at present. Available in flat sheet form as well as special molded shapes, the material can be blanked or punched.

Appearance has always been considered to some extent by designers, but ideas have changed radically in the last few years. There was a time when patterns representing fruits and flowers were cast on machine forms and elegant designs incorporated in structural members. Today the emphasis is on smooth contours and simplicity of line. Changing ideas and the influence of the industrial designer have had their effect, but much of the styling that has been done could not have been accomplished without the use of stampings—low cost, mass-produced coverings which concealed the innards of the machine and gave a pleasing impression of cleanliness and grace. The ability of die designers to meet the demands of the stylist is nowhere better illustrated than in the modern automobile tops and fenders. This is a phase of the stamping industry that



INDUSTRIAL LOCOMOTIVE: Largest narrow-gage diesel-electric locomotive ever built by General Electric Co., Schenectady, N. Y., this special 65-ton, 400-hp locomotive is one of five similar units for Carnegie-Illinois Steel Corp. Used in general switching around open hearth furnaces at the South Works plant, it has maximum trailing train weight of about 1400 tons on level track and 535 tons on 1.5 per cent grades. Two-axle trucks are of articulated design which makes them suitable for operation on 50 ft radius curves



ARISTOLOY
ELECTRIC FURNACE
ALLOY STEELS

STANDARD STRUCTURAL ALLOY STEELS
MAGNAFLUX-AIRCRAFT QUALITY STEELS
BEARING QUALITY STEELS • ALLOY TOOL STEELS
CARBON TOOL STEELS • STAINLESS STEELS
NITRALLOY STEELS • SPECIALTY STEELS

COPPERWELD STEEL COMPANY
WARREN, OHIO

18-8 STAINLESS STEEL PEN CAPS

Drawn Without Annealing

TOTAL take-in or reduction from blank diameters of 80.5 per cent is made without annealing, in the production of 18-8 stainless steel pen caps at Elsen Metal Products Co., Hoboken, N. J.

Allegheny Ludlum Steel Corp.'s lead soft type 304 stainless, is supplied cold finished by Wallingford Steel Co., in strip size $2\frac{1}{2} \times 0.0105$ -in. Processing begins with an initial blank of 2.5-in. diameter. First shell is cut and drawn on a double action press and then hopper fed to another press, the latter containing eight stations. Rough shells in the separate stages of drawing sequence are shown in the accompanying photograph.

Product of the final draw is a thin-walled shell with a diameter of 0.488-in. and a height of 2.4375-in. From this the final pen is formed.

While particulars of the drawing operation were not revealed, it was



indicated that care is necessary in developing correct die forms, in distributing the reduction over the various stages of the sequence, and in the selection of die material, speed of drawing and lubricants.

is so well established in the mind of the designer that it is hardly necessary to dwell upon it. On the other hand, overglamorizing of the plastics created a widespread notion that the plastic car is just around the corner. No doubt a beautiful car could be molded—perhaps out of glass cloth laminate—but what about the cost compared to stampings? And how well would a plastic fender endure the shock of bumping and scraping through city traffic? The designer considers these things and there is little danger of his going off half-cocked. But reputable engineers are interested and are investigating the possibilities of this car.

On the other hand, molded plastics have much to offer for household appliances such as refrigerators, washing machines, kitchen mixers, and so forth, and the stampings industry can expect stiff competition in this and several other fields. The strong selling point for stampings is the strength and toughness of the product and the fact that these qualities can be combined with beautiful appearance at no sacrifice of either.

Considerations so far discussed have had to do mostly with the functional requirements of a part—its necessary properties if the machine is to function properly and appeal to the buyer. If it is to be sold in quantity and at a cost

attractive to the buyer, the method of manufacture enters in. While a very careful designer will draw up alternative designs employing, perhaps, die castings, stampings, combined perhaps with screw-machine products or die-forged parts, many other designers are apt to be governed in their choice by previous experience. If in his last similar problem he was fortunate enough to obtain unusually fine co-operation from the producer, including assistance in modifying his design for most economical production, then he is likely to give the same producer first consideration rather than shop around every time he has a new design. This is fine for the producer with the inside track but it is tough for the fellow with the competitive process. Although the ideal designer should be a strictly impartial engineer whose judgment is swayed only by scientific facts, the fact remains that he is still a human being. And the same rules of salesmanship and service apply to him as to anyone else.

Due to the multitude of considerations which enter into the machine designer's work it is impossible for him to be an expert in any one field. The designer can be expected to have a good general knowledge of the stamping process but the fine points of pressed metal technique necessarily must be left to stamping experts. It is therefore important

that every stampings producer should have at least one engineer whose business it is to be fully conversant with all the techniques of stamping, forming and drawing, with the limitations that it imposes on design, and with the short cuts and modifications that can be made to facilitate production and reduce cost.

At the same time the designer should be thoroughly familiar with the principal methods of joining metals, because of the fact that as mentioned before, a big field for stampings in machine design lies in the more extensive use of built-up parts made by permanently assembling stampings with each other and with screw machine parts or even drop forgings. Principal methods of joining may be broadly classified as brazing, welding and adhesion.

Brazing Alloys

Brazing alloys include a great variety of materials such as copper, silver alloys, bronze and the so-called eutectic alloys which are tailored to suit the base metals. In brazing, the metals to be joined, or parent metals, are not melted, the filler material always having a lower melting temperature than the parent metal. The holding power is derived primarily from a knitting together of the crystal grains of parent and filler metals together with a certain amount of alloying.

Tests made on a series of silver-brazed butt joints in stainless steel plate showed that for joints less than 0.024-in. thick the joint strength exceeded that of the filler metal alone. At the optimum thickness (about 0.015-in.) the joint strength was three times that of the filler alone. This is probably due to the formation of a new alloy of filler and parent metals. Below this optimum thickness, the strength falls off, due probably to the inability of the filler metal to penetrate between the joined surfaces at high spots when they were pressed together.

In the light of the foregoing it will be evident that stampings which are to be joined by brazing must be clean and accurate at the joined surface so that there is a uniform clearance of the correct value for maximum strength. The molten brazing alloy flows between the assembled surfaces by capillary action, but will not penetrate if the area is too large. Ordinarily a light press fit up to a clearance of 0.0015 to 0.003-in. is best, depending upon the materials. How a press fit can suck in molten alloy can be understood if it is realized that metal surfaces are not uniformly smooth and with a light fit only touch at a few points, having sufficient space between at other points.

Because of the free flow and strong

clear joints it produces, copper is generally considered best. But a temperature exceeding 2000°F is necessary and to heat the mating parts properly it is generally necessary to employ furnace brazing. With the proper type of continuous furnace using a controlled atmosphere and preplaced brazing alloy, high production is possible. It is desirable to avoid a wide range of thicknesses in the parts to be joined, inasmuch as a section only a few thousandths thick will attain brazing temperature in a few minutes while a ½-in. section may require three-quarters of an hour to reach the same temperature.

A recent outstanding example of what can be accomplished with copper brazing is the cylinder block for the new Crosley 4-cylinder automobile engine. This assembly of approximately 125 pieces weighs 14.8 lb before machining, and only ½-lb of metal is removed in the few light cuts and honing operations required. The parts, consisting of 20-gage SAE 1010 stampings with cylinders and guides of chrome-molybdenum tubings are held in place by press fits, spot welds and crimping and copper brazed in a 60 ft furnace which includes a section in which air-hardening of the alloy steel parts is achieved.

The lower melting point brazing alloys can be melted by a gas torch or by induction or resistance electrical brazing. Induction heating avoids the necessity of heating the entire parts to be joined. Because it does not depend on conduction of heat through metal and through surface films it is extremely fast and can therefore be highly localized, preserving the physical properties of adjacent sections and avoiding scaling or even discoloration. With accurate control and automatic timing, uniform results are easily obtainable with unskilled operators. Induction heating depends on the creation of eddy currents in the material to be heated. Resistance losses of these currents are proportional to the square of frequency and the square of current in the field-producing conductor, while in the case of magnetic materials there is also the hysteresis effect due to molecular friction, proportional to frequency.

Another source of fast heat is electric resistance brazing which utilizes heat generated either in the parts to be joined or in the electrodes. The heat is applied under pressure which is maintained until the alloy has solidified.

Welding processes utilized in assembling stampings include resistance (including spot, seam), arc, gas, and atomic hydrogen. Of these the resistance welding processes, which require no filler, can probably best be adapted to the majority of stamping assembly designs.

Heating is highly localized and pressure is maintained until the weld has solidified, thus insuring a sound joint. With arc welding the intensive heat (6000 to 7000°F) may be more widely distributed and precautions are necessary against warpage or against burning of thin sections. Gas and atomic hydrogen welding permit more controlled applications of the heat. Atomic hydrogen welding is actually a flame formed by the reuniting of hydrogen atoms (H) which have been dissociated from molecules (H₂) by the heat of an electric arc. The energy of reuniting produces a flame whose temperature is greater than any oxygen-gas flame but less than that of the arc itself. Control of heat is good, inasmuch as the flame can be held at a slight distance from the parts to be welded.

Joining With Resin Adhesives

Resin adhesives offer a method of joining that made great strides during the war. The best adhesives for metal—such as Cycleweld—require elevated curing temperatures of 200 to 300°F. Until set the parts are firmly held together in hydraulic or spring-loaded presses. Shearing strengths as high as 3000 psi are obtained with such adhesives which, incidentally, should be loaded in this manner rather than in tension. While such adhesives can be and are being used for metal joints, their great advantage lies in this ability to join metallic and nonmetallic parts such as plastics or rubber and metals, thus opening up a wide new field for combination parts. Vibration mountings are an ex-

ample of applications in this field.

The engineer with a stamping company should also be thoroughly familiar with the other processes and quick to recognize where they may possibly have the edge over stampings so that the very best possible combination of parts results. Spinning, stretch-forming, tangent bending, roll-forming, etc., are to some extent competitive with stampings, and it is well worth while to study the types of parts that are being made by these processes so that alternative designs can be worked up to utilize stampings. One of the best-known examples of what can be accomplished by such study is the 0.30-caliber carbine trigger housing. Based on a 3 million production run, this part cost \$5 as a machined forging and \$4 as a machined casting. Designed as a composite stamping assembled from 14 separate parts by projection welding and copper brazing, requiring little machining, the part cost only \$2.50.

If the widest possible use for stampings is to be achieved, it is important that stampings producers share the results of their efforts. They should not only study the work of others but should be willing to share their own information. In the Pressed Metal Institute stampings manufacturers have an ideal medium for the exchange of information. One of the most valuable services that the Institute can render its members is the dissemination of knowledge concerning new designs utilizing stampings. In this way the industry can go forward as a whole in healthy competition with other fabricating processes.



PORTABLE MINE ROOF: Electrical substation in the Nellis, W. Va., coal mine of American Rolling Mill Co., is covered with portable steel roof made from corrugated tunnel liner plates. As work progresses in the mine, metal roof can be moved to new location.

Hot-Dip Galvanizing Practice

By WILLIAM H. SPOWERS JR.

President

Spowers Research Laboratories Inc.
New York

ONE of the latest and presumably the most efficient furnace settings yet designed for galvanizing is heated with vertical alloy tubes which radiate the heat against a large kettle of molten zinc.

Development of the vertical tube furnace dates back many years, to the days of the old soft coal, Dutch-oven type of installations when every few months all available help was gathered in the plant as quickly as possible to bail out what zinc remained in the kettle and to dig the rest of it from the pit beneath. Every few months kettle failure occurred. Today modern settings work continuously from 4 to 7 years and are not permitted to burn out and spill.

Troubles of the Dutch-oven furnace, still in use in some plants, were legion. That it could actually be used was its one virtue. If it lasted 6 months on continuous production it did well. Attempts to lengthen its life consisted mainly of placing a bed of lead in the bottom, which was to some extent effective but only resulted in the spill taking place at a higher point; the entire kettle was sometimes placed in a larger kettle which in turn contained lead; its dross loss was tremendous; tight bonds were impossible and constancy of temperature was unheard of.

The necessity for larger sized equipment made the use of coke desirable inasmuch as it was a soft fuel and could be fired directly against the kettle with little danger of hot spots. The use of lead in the bottom of these installations was for some time continued, more because of force of habit than of sound reasoning, but this has been finally discontinued. However, the dross area of



Fig. 5 (left)—A modern straight-wire galvanizing installation

Fig. 6 (below)—Vertical tube type galvanizing kettle. Cut-away section shows location of glow tubes inside furnace walls

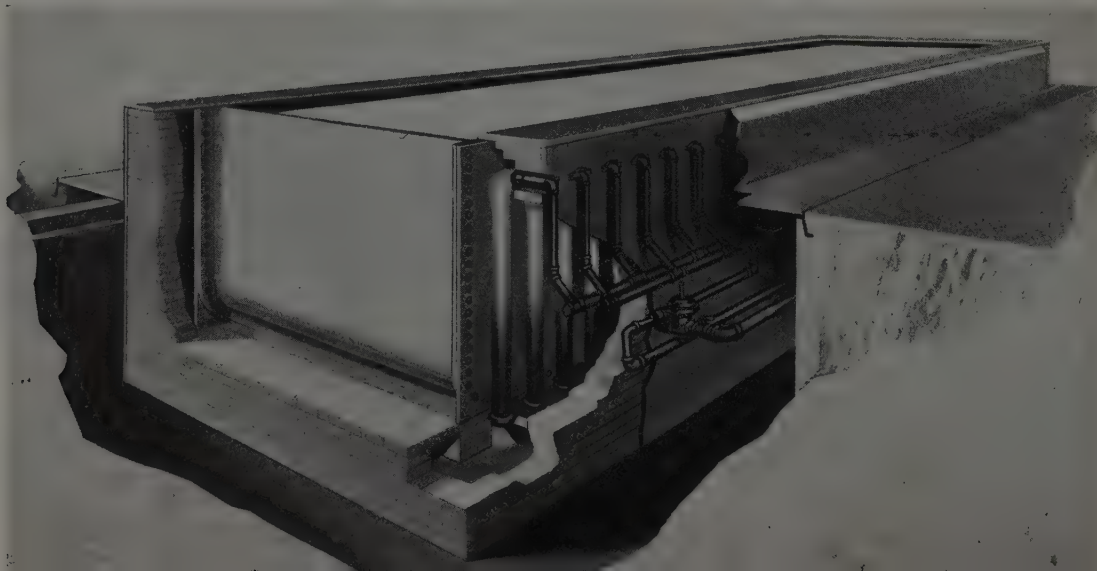




Fig. 7 (above)—High-fired gas installation. Setting of this type often afforded 4-year campaigns at full capacity production

about 8 in. in the bottom was still protected by bricking up the sidewall plates for about this distance on the outside.

The necessity for ample capacity had become apparent about this time. Attempts also were made to apply radiated heat to the kettle in order to avoid any impingements or localized conditions. The burners fire directly upon a bed of refractory stones which absorb the heat and radiate it against the sidewalls of the kettle. This design was a step forward and resulted in many economies over older settings because many of the first installations were based on capacity and sidewall area and the design centered about these fundamentals.

Later, however, after this principle had been established, came the high-fired setting shown in Fig. 12. This setting accomplished the desired result. With a properly capacitated kettle and a properly proportioned unit for the type and grade of work to be done, this setting offered a large degree of control over the heat input from top to bottom of the kettle, as well as from end to end when this control was needed. Many of the settings of this design have served 4 years and some 7 under full capacity production.

It is obvious that this design offers large savings in fuel over any of the so-called end burner open type units, because of the possibility of proper handling and guidance of each Btu developed.

Electrically-heated settings never have reached any high degree of popularity in this country probably because of high-cost current and high-installation cost. There are many possibilities, however, for the use of electricity in galvanizing but until current and installation costs are reduced and producers of this type

of equipment pay more attention to the problems of the process little interest in the electrically-heated unit can be expected.

The author's idea, which led to the development of the vertical tube type galvanizing installation shown in Fig. 6 was appropriated from the vertical tube box annealing operation adopted recently by sheet manufacturers. Fig. 9 shows a section of the vertical tube box annealing furnace and a pile of sheets inside with the furnace covering the entire assembly. The tubes in the fire chamber are fired from below because, in this operation, the heat in the box rises to the top. Consequently the higher heat must be applied to the bottom in order to equalize the temperature throughout the pile of sheets being subjected to the annealing operation.

Fig. 10 is the same as Fig. 9 with the exception that it is inverted. Assume that the stack of sheets is a bath of zinc and

that the inner cover is the galvanizing kettle. The tubes are now heated from the top, placing the highest heat at the top half of the kettle where it is most needed. Thus is the firing arrangement for the modern galvanizing kettle of the vertical tube type.

Data on the first wire galvanizing kettle heated by radiant heat were presented before the Wire Association Jan. 8, 1931. This kettle was first drossed April 18 and delivered 1020 lb of dross. It was drossed the second time May 23 and delivered 860 lb of dross. The consumption of spelter during 5 months of continuous operation was 175,822 lb dross totaled 1880 lb. This is a loss of slightly over 1 per cent for the 5 month operation.

This condition continued but with slight gain in dross percentage for 4 years when a new pot was installed. The initial kettle after removal showed an exceedingly uniform breakdown and had

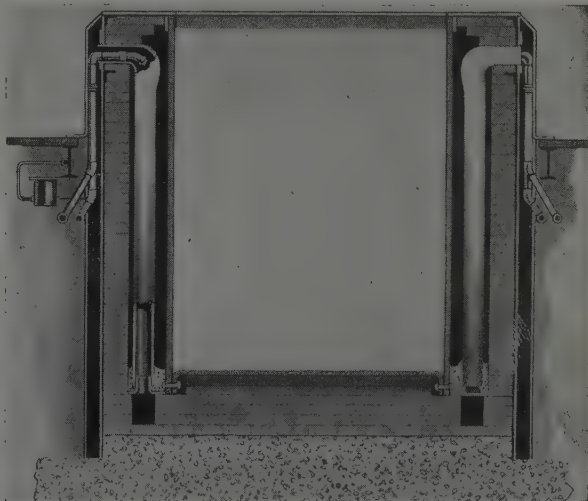


Fig. 8 (right)—Cross sectional view of vertical tube type galvanizing furnace

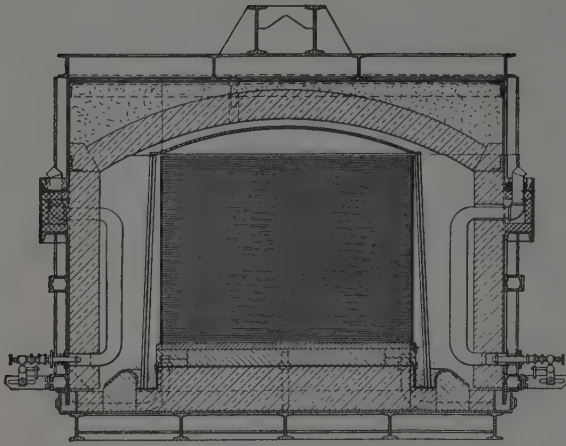


Fig. 9 (left)—Vertical tube annealing furnace. The furnace proper covers the pile of sheets as shown

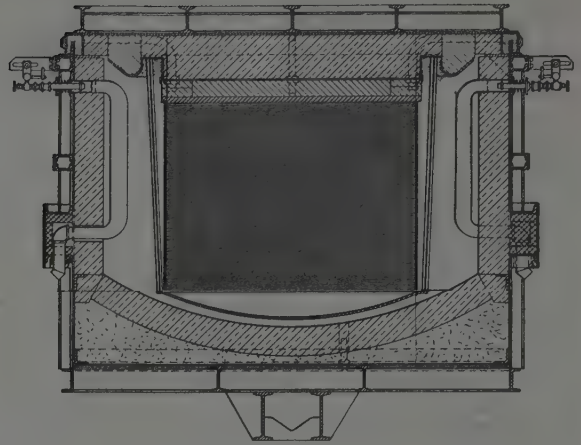


Fig. 10 (right)—Same type of vertical tube annealing furnace as shown in Fig. 9. Illustration is inverted intentionally

the appearance of at least one year more of life.

A companion installation of the shallow underfired type, operated continuously during the same 5 months with a yield of 21 per cent dross and a kettle life of 6 months.

Operating data covering these installations prove that there is a distinct relationship between capacity and type of heat application with kettle life and dross consumption.

This installation was heated by the glowing ribbons of such design as to offer perfect control of heat input from end to end of kettle and from top to bottom.

However, this method of heating the galvanizing kettle was uneconomical in many localities because of high-fuel cost.

Research, however, has resulted in the perfection of this glowing heat principle to gas or oil for hot galvanizing kettles.

System of Heating

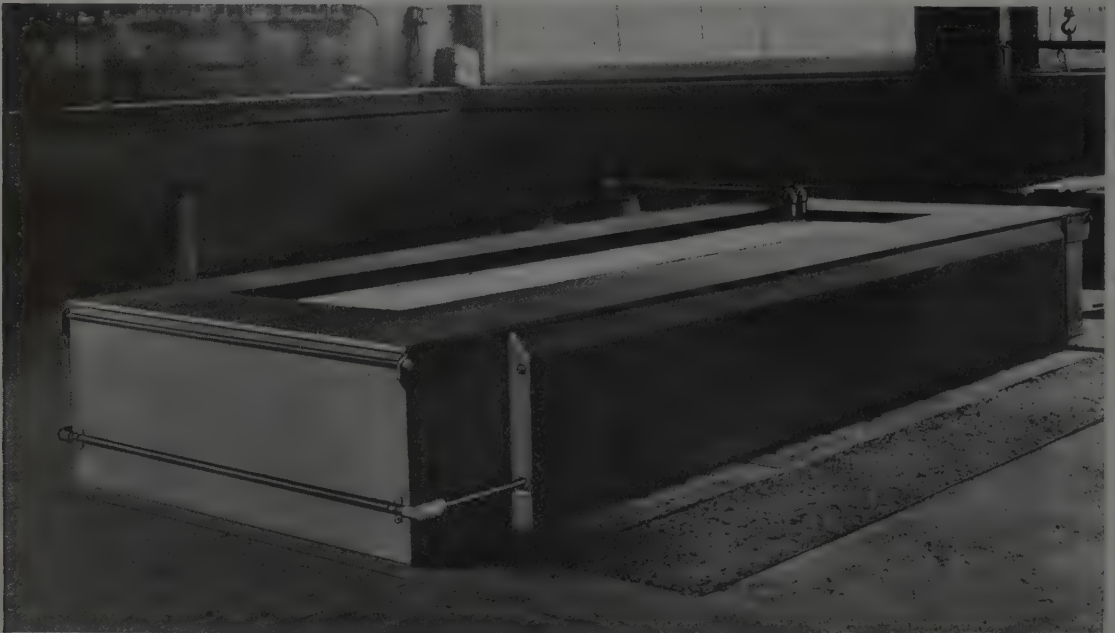
The feature of the initial installations is the system of heating which consists of a series of vertical tubes located inside the furnace walls. Gas burners fire into the upper ends of the tubes and the hot products of combustion exit from the lower. The vertical portions of the tubes are heated and the heat is radiated into the interior of the furnace.

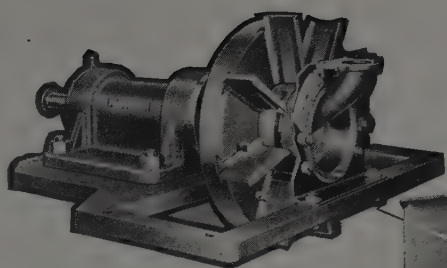
One reason for the success of this type

of firing is that the vertical heating element allows the fuel to be burned in the upper section of the tube so that a large portion of the heat liberated is radiated to the upper portion of the kettle where it is most needed.

These vertical hot tubes are located within the brickwork of the furnace along the sidewalls of the kettle at any interval necessary according to the tonnage and capacity of the kettle. The hot tubes are of chrome-nickel alloy and are all alike, each being approximately 4 in. diameter and equal in height to the depth of the kettle with a solid cast elbow at the top welded into sleeve. Gas burners are of blast type and fire into upper ends of

Fig. 11 (below)—Modern galvanizing kettle which is fired through vertical tubes





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the vertical tubes in the furnace.

A new principle in effecting high efficiency in tube-type heating is the application of refractory "core busters." These are star-shaped baffles, several of which are inserted within each tube to form a chain, from the lower portion of the tube to a point about half way to the elbow. The dual effect of these core busters is to cause the hot products of the combustion to scour the tube, thereby giving up the maximum amount of heat; at the same time they become incandescent so that considerable additional heat is forced through the tube by radiation.

A third effect of these core busters is to so baffle the tubes that the combustion is completed in the upper portion of the tube, thereby concentrating the largest amount of heat at the upper part of the kettle where it is most needed.

Fuel within the tubes is ignited by an actuating button.

Major advantages of this type of heat application for galvanizing kettles, which effect materially the economy of operation and quality of products, are as follows:

1. No Possibility of Flame Impingement on the Kettle: Fig. 6 shows that the burners and the flame given off are entirely self-contained in the tubes. Flame impingement on the kettle is impossible. Neither is there any heat flow against the sidewalls of the kettle. The heating area is a tight chamber utilizing every bit of heat given off by the glowing tubes for the purpose of heating the kettle and losing no heat to the outside. There

is no burning gas or gas flow in this chamber; and as a result, a heat of the softest possible quality, plays against the walls of the kettle.

2. Uniform Control of Heat Input From Top to Bottom of Kettle: Two of the greatest sources of heat loss in galvanizing kettles are first; radiation from the top; and second, from the work immersed in the top half of the kettle. These reasons alone require that the hottest heat be applied to the upper portion of the kettle.

But the necessity of high heat is more fundamental than either of these reasons and involves the dross formation. Heating a galvanizing kettle from the bottom or up through the dross or too low on the sides, or by the use of too concentrated a heat transfer area, creates a dross flow upward when it should be downward and produces more and more dross. Application of heat to the kettle at too low a point results also in a dross contaminated galvanizing area with the resulting bad effects on bonding, smoothness of coat, etc.

By the use of the previously mentioned core busters, the heat given off by the tubes may be controlled in any manner desired by the designer and enables him to control to a nicety the heat application from top to bottom of the kettle.

3. Uniform Control of Heat Input From End to End of Kettle: Fig. 6 and 8 depict how uniform heat control from end to end of the kettle is secured. This feature is important to the continuous galvanizer and is accomplished by the control of the individual tubes which are adjustable to suit any given galvanizing situation existent.

4. Low Dross Losses: Reference was made in the forepart of this section to actual results as to dross on a similar type of heat application and included ease to heat input, softness of heat application, absence of gas flow on the sidewalls, and of most importance, positive control of any dross flow within

the molten zinc which makes conclusively for low dross losses in this type of furnace.

5. Long Kettle Life: The dissolving away of the side plates of the kettle makes a large contribution to dross losses. By the same reasoning low-dross losses make for long life of kettle. The heat given off by the tubes and delivered to the kettle is of the soft glowing type which affords an attractive kettle design.

6. Low Fuel Cost: In this design there is no opening in the heat chamber. Every Btu delivered by the tube is available for heating the kettle.

7. Availability for Either Gas or Oil: The flexibility of this design is such that either gas can be burned direct or oil that has been converted to gas by the simple use of a gasifier. In some localities this means a large economy in fuel.

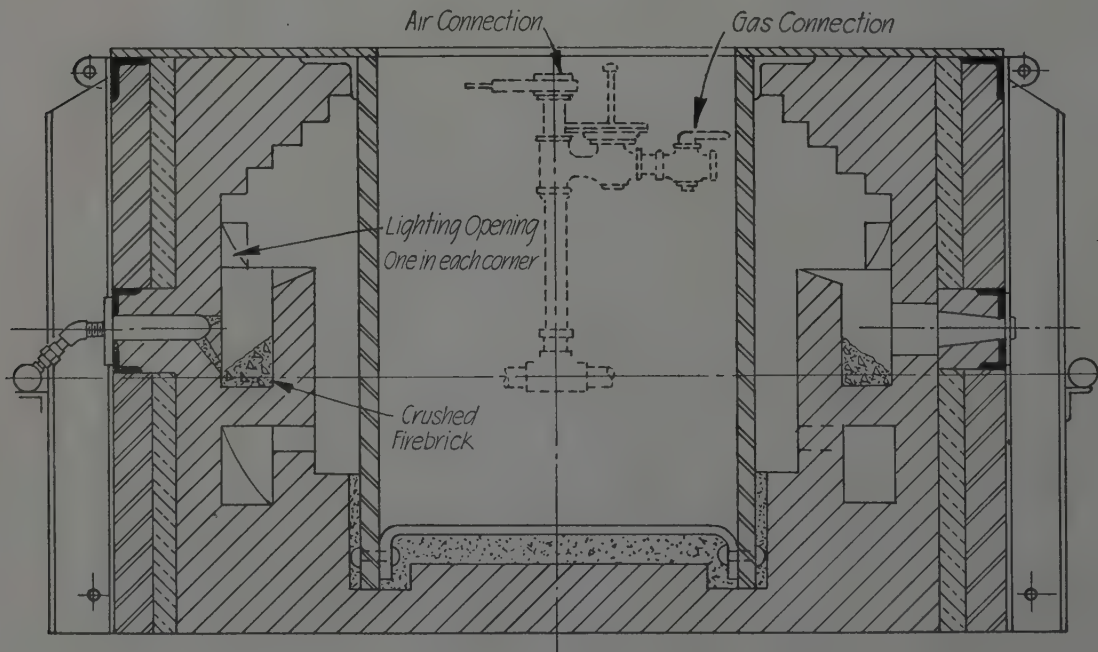
8. Kettle Replaced Without Disturbing Brickwork Setting: This installation is so designed that when eventually a replacement of kettle is considered advisable, this replacement may be accomplished simply by lifting out the old and dropping in the new vessel. The advantage of this procedure over the old rebuilding process is apparent both in economy and saving of operating time.

9. Compact Setting: On account of the grade of insulating brick used in this type of furnace, and the fundamental design of the furnace itself, the distance between the sidewalls of the kettle and outside brickwork is reduced 10 in. compared with the latest type impact-fired designs, and without any additional heat losses.

At present the two types of furnaces in most successful use and whose advantages are comparable are the high-fired refractory bed type, properly proportioned, and the previously mentioned vertical tube type.

(To be continued)

Fig. 12 (below) — Sectional view of high-fired gas kettle showing position of burners



quate for efficient handling of bar stock.

Mechanized Method: Fork truck and other powered materials handling equipment can be a great saver of time and money in moving, unloading, and storing bar stock. Fork truck can be used to unload bar stock directly from motor trucks where bars are accessible from the side. Wherever bars can be reached only from above, a hoist may be used in conjunction with the fork truck. A hoist lifts load out of freight car or motor truck, transfers it directly to fork truck, or drops load on floor where fork truck can get at it. Fork truck can pick up a load of bars, carry it to a scale, pick it off scale, transfer load to a wagon, and then tow the wagon into store room. Fork truck then can pick load from wagon and deposit it either on floor or near racks.

A fork truck lifting 3600 lb of bars from a specially designed wagon is shown in Fig. 3. Wagon is built so that the truck forks can get under the load. A load of 230 bars is taken out of a freight car, weighed, measured, and inspected, and moved to raw stores in 10 hours with the use of a fork truck and a hoist. When this same job was done by hand, it took more than a week.

Precautions should be taken when bars are carried on forks of a fork truck during unloading and before bars are transferred to wagons. Forks should be tilted back to prevent load from slipping; forks should be spread apart as far as possible to supply greatest carrying area; and bars should be bundled together with baling wire or otherwise secured and balanced evenly on forks.

Bars should be transferred to wagons

as soon as possible. Wagons should have stakes on all sides to prevent bars from sliding to floor. And there should be a space under bars, whether they are on wagon or tiered in storage, to insert truck forks, as shown in Fig. 1. In this operation, same load as in Fig. 3 is piled on dunnage by tilting forks and allowing bars to roll on to skids. This is done in a matter of minutes. When done by hand and hoist, it took three men all day just to pile these bars on dunnage.

When bars are on a wagon or dolly, load can be steered through narrow doors, around sharp corners, and into cramped areas; whereas, if bars are carried on truck forks, width of path of travel in governed by length of longest bar.

In weighing bars carried on fork truck,
(Please turn to Page 124)

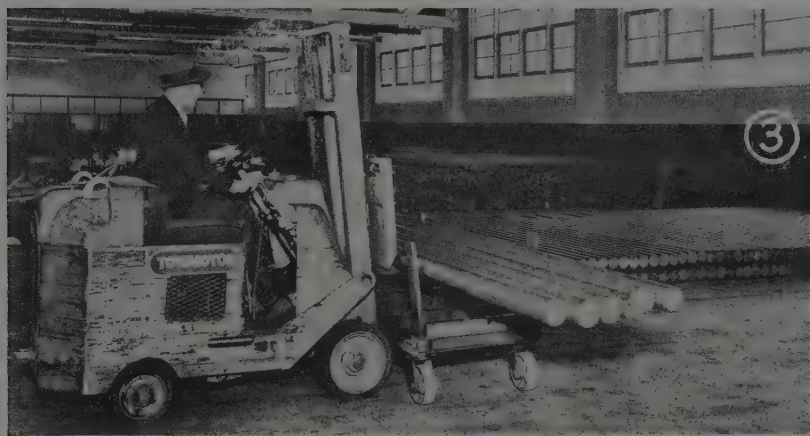


Fig. 3—This specially designed wagon has traverse boards so that forks of truck can slide under bars

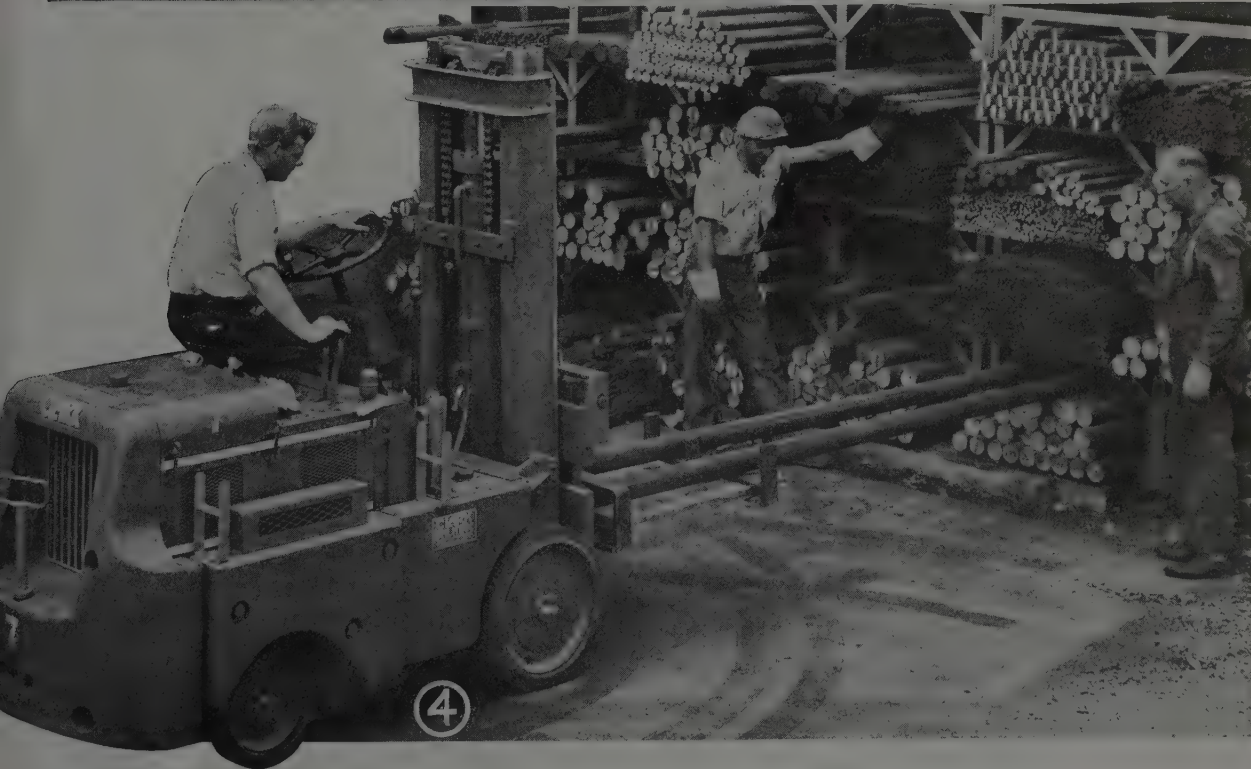


Fig. 4—Special bar-handling rig enables fork truck to push bars into rack

Industrial Equipment

Sand Screener

Portable model M Screenator developed recently by Beardsley & Piper Co., 2540 North Keeler avenue, Chicago 39, cleans, cuts, screens, aerates and blends sand for production foundries and job shops. It is mounted on pneumatic tires for portability.

A brace from frame fits on wheels and locks them to eliminate movement of machine while in operation. Handle is retractable and is located so that machine can be moved forward without going around to opposite end.

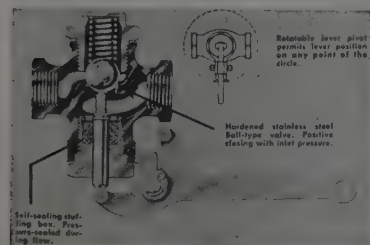


When positioned for use, its low height and resting angle makes shoveling easy. Electrically operated, it plugs into an available power outlet. Conditioned sand may be discharged as far as 25 ft and elevated from 2 to 10 ft.

Steel 8/26/46; Item No. 9488

Air Operating Valve

Self-sealing, air operating, ball type valve, known as Type BA, is announced by Leslie Co., 152 Dalafield avenue, Lyndhurst, N. J. Fitted with a hand



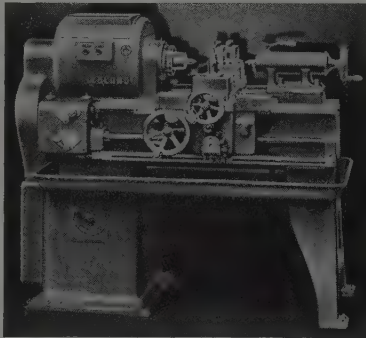
opening lever and rotatable pivot so that lever can be located in any position, valve can be opened instantly from any position with either a horizontal or vertical pull. Ball valve closes tight with inlet pressure and will not collect dirt or other foreign matter.

When fitted with a cam operated lever, valve becomes Type BAC (not illustrated) and permits instantaneous valve opening and closing by throwing lever in desired direction. Lever is held in position thrown until manually returned to the original position.

Steel 8/26/46; Item No. 9507

Light Cutting Lathe

R. K. LeBlond Machine Tool Co., Cincinnati 8, is offering a new 13 in. motor head rapid production lathe designed for light cutting operations at



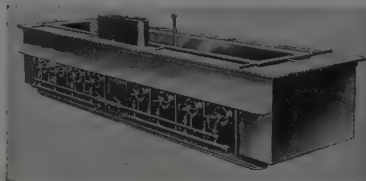
extremely high speeds. Instead of usual gears and belts, headstock contains a stator bolted to casting, and a rotor pressed onto spindle. Motor head operates at 5 hp at top speed, and runs quietly without vibration at speeds as high as 3600 rpm.

Electric start-stop box replaces levers and handles formerly used on the machine. All controls are within easy reach of operator, including finger-touch speed-change handle located in the head end leg.

Steel 8/26/46; Item No. 9535

Pot Furnace

A low-temperature, fire tube bath pot furnace capable of holding a very narrow temperature control band is announced by Don C. Campion Laboratories, 9086 Alpine avenue, Detroit 4. Adaptable for tinning, babbiting, lead dipping and



other operations up to 1200° F, the furnace is heated by burning a gas-air

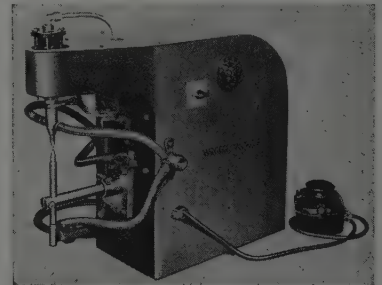
mixture in a fire tube submerged in bath to be heated.

System provides extreme sensitivity to temperature control by eliminating thermal head common to refractory-line combustion chambers. Hot products of combustion envelope exterior of bath pot on their long way around to exhaust port. Furnace can be built in almost any size and shape.

Steel 8/26/46; Item No. 9473

Spot Welder

A bench type spot welder announced by Weldex Inc., 7330 McDonald avenue, Detroit 10, is a 3 kva, 220 v, 60 cycle, single phase, air-operated welder with foot control, electronic timing and adjustable pressure switch. Known as model

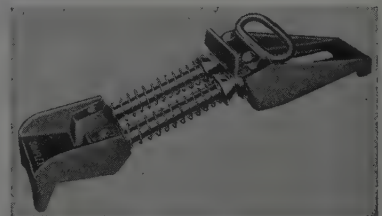


263-A, it spot welds light metals up to 18 gage. Machine measures but 21 in. high, 10 in. wide, and 23 in. deep, and weighs approximately 135 lb.

Steel 8/26/46; Item No. 9465

Track Shifter

Simplex track shifter manufactured by Templeton, Kenly & Co., 1020 South Central avenue, Chicago 44, provides fast track lining for any weight track in any type ballast, and for lining swings, sharp

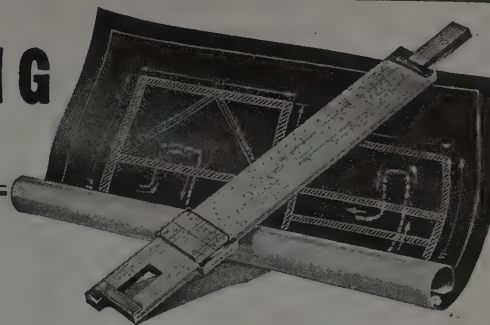


curves, frogs, turnouts, crossovers and ladder tracks.

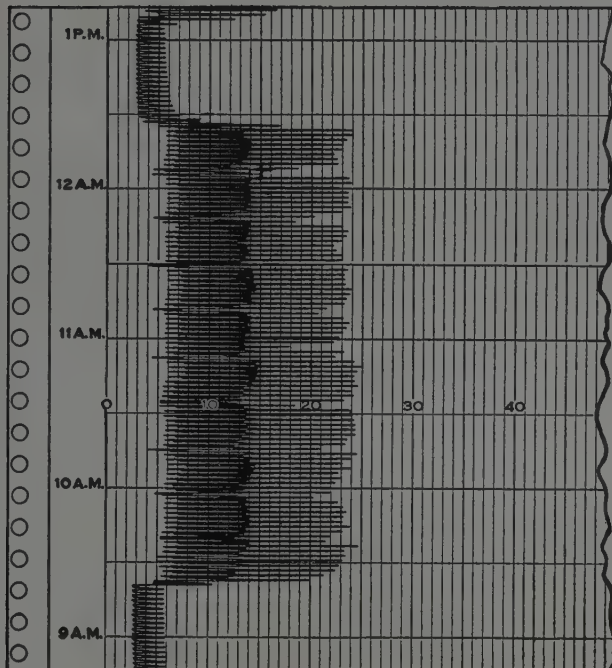
Powered by conventional track jacks, track shifters are placed under rails in holes located where desired. Jacks are not under proper end of track shifters and tilted well forward. Track is lifted just above grip of imbedded ballast on

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 119.)

OVEN ENGINEERING NEWS



SAFETY IS POSITIVE IN ALL IOE INSTALLATIONS



The Industrial Oven Engineering Company has long been a definite proponent in designing and fabricating equipment to perform hazardous operations economically, efficiently and primarily safely.

To this end, in cases where requirements are such, continuous records are made of the explosive conditions which are encountered in the atmosphere in highly dangerous processes like fabric cementing, fabric coating and solvent evaporation; in fact conditions encountered when processing most of the synthetic materials that are in use today.

The chart above shows the continuous record of explosive conditions in a continuous fabric system that has been in operation for some time on the rubberizing of fabric.

If you will observe the record closely you will find that all of the explosive concentrations fall below 25% of the lower explosive limit. This continuous record is taken at four points throughout the complete system and meter the explosive concentrations at all critical points in the system.

In reading the chart it will be observed that 3 of the readings are in the neighborhood of 15% of the lower explosive limit while the readings at only 1 point run between the ranges of 20 and 25%.

This particular installation is handling approximately 3 gallons of solvent grades of gasoline per minute, and this gasoline was continuously evaporated at a temperature of 180° F.

In addition to such a careful check on explosive concentration the installation was further equipped with positive and fool-proof means for the dissipation of static discharges which naturally build up on rapidly moving films, fabrics or papers as they pass continuously through a processing system.

Operating economies were considered also, and they incorporated such elements as continuous operation, high speed operation, space saving and attendant labor economy.

In every IOE installation safety is essential because without safety production usually lags.

All IOE installations are designed to eliminate the hazards of explosion and mechanical failure.

We make cord coating, cable lacquering systems, complete fabric cementing systems, complete fabric coating systems, continuous takeup and payoff stands, dip tanks, drying ovens, constant tension constant speed takeup machines for plastic resin tubing and coating cords, rubber tubing, V-belt cords and other continuous monofilament or film materials.

Write for "High Speed Handling and Drying in the Cementing of Tire Fabric."

This bulletin is a description of a high-speed continuous method for applying cements, coatings or impregnant to continuous materials.



THE INDUSTRIAL *Oven Engineering* COMPANY
13825 TRISKETT ROAD, CLEVELAND 11, OHIO

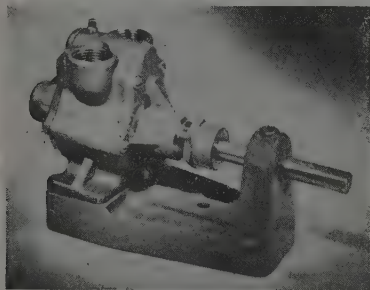
★ ASSOCIATED COMPANY: JAMES DAY MACHINERY LTD., LONDON, W. 1, ENGLAND ★

movable bushings of the track shifters. As these are inclined sharply forward, bushings move down their shafts, carrying track forward in the direction of line. When the track is shifted as far as desired, jacks are tripped and track is dropped.

Steel 8/26/46; Item No. 9544

Double Impeller Pump

A gearless pump with standard 1 in. connections has been developed for circulation of water, light oil and other liquids by Eco Engineering Co., 12 New York avenue, Newark, N. J. Pump employs double impellers made of several layers of a pressure-vulcanized, lami-



nated material, and is capable of operation in either direction.

Built-in driveshaft bearing and base eliminates side-pull when pump is powered by a belt-drive and pulley. Impellers pass sand, grit, filings, or sludge without stalling or pump body damage.

Pump can be mounted at any angle. Its capacity varies from 7.5 gpm at 600 rpm to 23 gpm at 1800 rpm.

Steel 8/26/46; Item No. 9446

Vertical Milling Machine

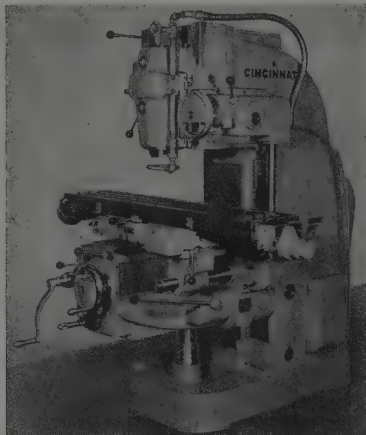
With wide speed and feed ratios—60 to 1 and 120 to 1, respectively—a new vertical style milling machine is being produced by Cincinnati Milling Machine Co., Cincinnati. Designated as model No. 2 MI, the machine is powered by a 5-hp motor and has 16 spindle speeds from 25 to 1500 rpm, changes being made hydraulically.

Motor and mounting may be removed as one unit by removing four bolts. This system is used to adjust belt tension. Multiple disk spring-loaded brake stops spindle instantly when drive clutch, which is of single disk dry-plate type, is disengaged.

With all lubrication except table and way being automatic, this system is enclosed within machine. Coolant system also is enclosed.

Each of the independent feed controls has its forward, neutral and reverse position and cross and vertical hand cranks are automatically disengaged when their respective power feed lever is engaged—an important safety feature.

Machine has a "live" rapid traverse at rate of 150 ipm, longitudinal and cross,



and 75 ipm vertical. It is equipped with a 4-position turret stop. Back gear construction maintains consistently low speeds throughout spindle drive.

Steel 8/26/46; Item No. 9741

Strain-Gage Amplifier

Strain-gage amplifier designed for use with resistance-wire, electromagnetic and magnetostrictive strain gages for amplifying small electric signals varying in frequencies from 0 to 1000 cycles per second is being manufactured by General Electric Co., Schenectady, N. Y. It is



operated in conjunction with either a magnetic oscillograph or a cathode ray oscilloscope.

Available for use on 115-v, 60 cycle ac or for battery operation at 24 v, amplifier consists of a 5000-cycle oscillator unit, a power unit, and either two or six identical amplifier units, all mounted in separate chassis in a sturdy case. Amplifier channels are stabilized against line voltage change or variations in tube

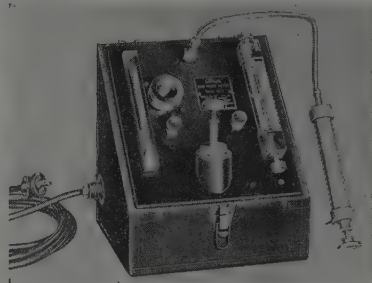
characteristics. Each can be removed for servicing and inspection.

Steel 8/26/46; Item No. 9478

Dew Point Indicator

Illinois Testing Laboratories Inc., 420 North LaSalle street, Chicago 10, has developed the Alnor indicator for simple rapid determination of dew point, relative humidity, grains moisture per pound and latent heat of any noncorrosive gas. Indications take place in an enclosed observation chamber under conditions which can be controlled and reproduced.

Sample is drawn from surrounding air or any enclosed space or from a



tank or gas cylinder. It is held at pressure above atmosphere produced by a hand pump. Depressing operating valve produces a visible condensation suspended in air or gas in observation chamber. Procedure is repeated to find end or vanishing point of fog of condensation.

Temperature of dew point of air or gas sample is read from chart based upon initial temperature and pressure ratio. Other factors are obtained from reference charts once dew point is known.

Indicator is manufactured in two ranges—for dew points between minus 20° F and room temperature and between minus 100 and 0° F. It may be operated on either 110 v ac power or battery power.

Steel 8/26/46; Item No. 9508

Battery Charger-Welder

A battery charger—arc welder combination developed by Hobart Brothers Co., Motor Generator Corp. division, Troy, O., includes separate control panels with instruments, for switching from charging to welding or from welding to charging.

Two models are being produced by Hbbart, Model No. 496 is a 300-amp electric motor-driven welder including MGC panel circuit for charging at a maximum rate of 200 amp at 50 v, direct current.

Model No. 479 is a 400 amp electric

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 119.)

motor-driven welder for charging at a maximum rate per battery of 150 amp at 50 v, direct current.

Steel 8/26/46; Item No. 9365

Electric Hand Truck

Automatic Transportation Co., 149 West 87th street, Chicago 20, is manufacturing the Transporter, an electric propelled hand truck which is made in four models: 4000 and 6000 lb capacity



platform models for use with skid platforms; 4000 lb capacity pallet model; and a special 3000 lb capacity special pallet model for tinplate.

Steel 8/26/46; Item No. 9537

Plug-In Relay

Hermetically sealed plug-in relays, developed recently by Ward Leonard Electric Co., Mount Vernon, N. Y. are designed for alternating or direct current operation in small radio transmitters, aircraft control circuits and other applications where space is limited. Completely encased in a cylindrical can, these relays provide protection against adverse atmospheric conditions such as moisture, dust, gases, corrosion, etc. Coil and contact connections are enclosed within

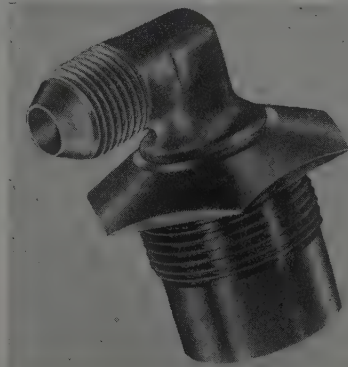
metal housing and are brought to prongs of octal plug base.

Relays are offered in contact combinations to double pole, double throw with alternating current contact ratings (at commercial frequencies) of 4 amp, from 0 to 115 v and direct current contact ratings of 0.5 amp from 25 to 115 v.

Steel 8/26/46; Item No. 9482

Swivel Pipe Coupling

All-Flex ball bearing swivel pipe coupling, newest product of Snyder Sales Corp., 5225 Wilshire boulevard, Los Angeles 36, is designed to convey fluids under high pressure through a pipe which



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A double row of ball bearings, plus metal-backed packings, gives lowest possible resistance to rotation, permitting ease of operation at all pressures. Performance shows a torque of 2.5 in. lb at 1500 psi and 9.6 in. lb at 3000 psi.

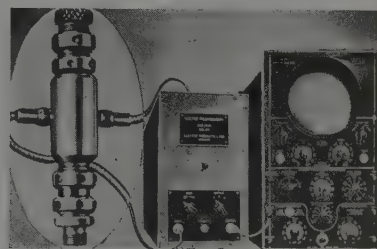
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Steel 8/26/46; Item No. 9492

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Pressuregraph developed by Electro Products Laboratories, 349 West Randolph street, Chicago 6, provides, with a cathode ray oscillograph, a linear pressure-time curve on its screen to indicate performance of any engine, pump, or other device subject to pressure variations. It shows erratic operation of a device



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Steel 8/26/46; Item No. 9521

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Hardenability Testing

(Continued from Page 73)

recently ASTM hardenability charts have been used.

Heat treated parts—with some rare exceptions—are given a tempering treatment, and tempered hardness cannot be estimated accurately from the ordinary Jominy hardenability curve. A tempering temperature of 800°F applied to a well quenched piece of 0.30 to 0.50 carbon alloy steel may fall in hardness as little as 10 or as many as 20 points rockwell C. This loss is likely to run relatively high on straight nickel steels and relatively low on molybdenum bearing steels. However, the hardness specifications on hardened parts is likely to have little more spread than 5 points rockwell C. With such a large variation possible in the hardness produced by tempering, estimating the hardness which will be obtained in a particular part from the as-quenched Jominy hardenability curve is hazardous. For steels with 0.30 or more carbon we therefore temper the Jominy bars at 800°F, and plot this data on the hardenability chart also. This temperature was selected not because we consider it the desirable tempering temperature, but because we consider it the minimum tempering temperature which is at all suitable for medium carbon alloy steels.

Reaching Specified Hardness

If the Jominy bar tempered at 800°F indicates that any part in question would not reach the specified hardness when tempered at at least 800°F, the steel is considered unsuited for the particular part. Within the past few years we had a moderate number of lots of steel which Jominy hardenability tests indicated were unsuited for the parts for which we wished to use the steel. Most of these lots were either 9400 series steels near the lower side of their analysis range, or steels which were actually below the analysis range.

Chart accompanying this discussion shows the Jominy hardenability of a lot of steel purchased for 4340 along with the AISI hardenability band for 4340-H steel. The curve for the Jominy bar tempered at 800°F is also shown. It will be noted the analysis of this steel is below the specified range on nickel and toward the lower side of the range on manganese, molybdenum and chromium. The steel would be subject to rejection because of failure to meet the specified analysis. However, with deliveries taking many months, such low hardenability steels were usually replaced with other more suitable steel, if obtainable, and the low hardenability material used for less critical parts requiring less total

hardness and less hardness penetration. In some cases low hardenability steel was used for parts which ordinarily are of carbon steels and not heat treated.

Returning to the chart, it will be noted that when tempered at 800°F hardness increases 3 points rockwell C—from 39 to 42—in going from 1/16 to 5/16-in. from the end. This is quite common, especially with steels which contain molybdenum. It is usually shown more as the tempered temperature increases, and may be the result of a precipitation hardening effect. Also, beyond 12/16-in. from the end the hardness after the 800°F tempering is identical with that as quenched. This also is a usual occurrence. In the poorly-hardened portion of the Jominy bar tempering, it usually shows only one or two points rockwell C less of hardness at the most; and frequently none at all or a gain of one or two points. If there is a slight gain it also is likely to be the result of a precipitation hardening effect.

Tentative Hardenability Bands

In June, 1945, the AISI issued section 10 of their Steel Products Manual, covering hot rolled alloy steels. This includes tentative hardenability bands for most of the commonly used alloy steels from which any of several different types of hardenability specifications may be selected. If these specifications are properly selected, and the steel is ordered to meet the specifications, failure to meet them may be the basis for rejecting the steel. For the past 10 months we have been ordering our alloy steels to meet hardenability specifications. Our specifications require that the steel meet or exceed the minimum hardenability shown by the AISI hardenability band at two distances from the quenched end. These distances are as follows:

For 0.27 or less carbon— $\frac{1}{8}$ and 4/16-in.
For 0.30 to 0.37 C, incl.—2/16 and 8/16-in.
For 0.40 or more carbon—2/16 and 12/16-in.

We selected the first point at 2/16-in. for the higher carbon steels because it may be determined more accurately than the 1/16-in. point. One sixteenth of an inch from the end of the bar is more likely to be effected by slight rocking or tilting. In spite of this, for the lower carbon steels, the 1/16-in. point is used because the hardness falls very rapidly for these steels. The farther point was selected at a distance which is usually equal to or beyond the point of inflection—the point where the curve is steepest. The as-quenched hardness at this distance is lower than desirable for good heat treating practice. We found, however, that a specified minimum hardness at this distance will cause rejection of certain undesirable heats which have relatively high carbon but low alloy, while a point nearer the quenched end

would not cause rejection of the steel.

AISI hardenability specifications provide that Jominy hardenability acceptance tests be run in accordance with provisions outlined by the SAE. These provisions specify forging down the steel and normalizing it. We do not ordinarily do this. Our medium carbon alloy steels are usually purchased as hot-rolled annealed bars, and are machined and heat treated without any intervening forging or normalizing operations. The Jominy bars are run the same way: They are turned down to 1 in. round by 4 in. long with a flanged end for holding in the quenching fixture. They are heated to usual quenching temperature and end quenched in standard manner. Two opposite $\frac{1}{4}$ -in. wide flats are ground the length of the bars. The hardness is taken along one of these as-quenched and the other after tempering at 800°F. Resulting data is plotted as shown on the accompanying chart except that the AISI range for the steel is not ordinarily put on. The chart is used for appraising the steel for any particular part. If hardenability is low, the steel is not used. We were never troubled with the hardenability being too high. With relatively high hardness specified for many of our parts, the as-quenched hardness always can be brought down to the desired level with a tempering temperature which is seldom above 1100°F and usually lower. The higher tempering temperatures are preferred as it is well known that for a given hardness and strength they give improved ductility.

Rerunning Hardenability Tests

So far, we have received no steel ordered to our hardenability specifications which failed to meet the specifications. When we do receive a lot of steel which falls below the hardenability specifications, it is necessary to rerun a hardenability test according to standard forging and normalizing procedure before we feel justified in rejecting the steel. With steel as scarce as it is this year, however, who would reject a lot of steel so long as it has a little iron in it?

Steel ordered before hardenability specifications were available, or before they were used, must be accepted if they come within the official analysis specifications. Looking back over the records we find 2 or 3 per cent of our alloy steel would have been subject to rejection if it had been purchased to hardenability specifications.

Occasionally the steel was for parts of small size or low hardness specifications, and it performed satisfactorily. When parts were larger or required higher hardness levels, it was necessary to shift the low hardenability steel to less critical parts or risk expensive rejections of finished parts which failed to meet the

specified hardness. Sometimes steel near the low side of the hardenability range, but still within it, may be unsuited for parts which require relatively high hardness. If this occurs, steel specifications should be changed to a material having a higher minimum hardenability—either by specifying a steel with higher carbon or more equivalent alloy content. The specified steel should have sufficient hardenability to always reach the hardness range of the parts involved, even when at the bottom of the standard hardenability range.

Carbon Content Raised

We found it advisable in many cases to raise the carbon content of steel for larger and higher-hardness parts. Sometimes this was done when substitutions were necessary, like substituting 9445 rather than 9440 for 4140. At other times the carbon was raised in the same grade of steel—like 4142 for 4140—if occasional lots of steel barely meet the hardness requirements.

We have no complaints about NE type triple alloy steels, provided they have sufficient hardenability. At present—with the same carbon content—9400 series steel has lower hardenability than 4100 series. Those in the 8600 and 8700 series come closer. If any of these series were modified to have equally good or better hardenability at an equally low cost, we would be quite willing to use them. We never used a satisfactory substitute for 4340 steel, although limited tests indicate that a steel like 9845 might be quite suitable if it were more readily available.

Jominy hardenability tests of carburizing grade alloy steels in the uncarburized condition are used, but they are given no draw like the higher carbon steels. These tests are less helpful than they are on the higher carbon steels. The analyses and grain size have an important bearing on distortion, retained austenite, etc., and are probably more important than they are in the higher carbon steels.

Jominy type tests may be run on specimens under 1 in. diameter. The standard Jominy quenching fixture with $\frac{1}{2}$ -in. orifice may be used on specimens as small as $\frac{3}{8}$ -in. diameter without the water hitting the sides. However, we do not ordinarily run such tests. The usual procedure on these small diameter medium carbon alloy steels is to oil quench a piece a few inches long and record its hardness as quenched and after an 800°F draw. Unless it is exceptionally low alloy steel there is little trouble with these small diameters except that decarburization may be relatively more severe than with some larger diameters.

In conclusion, we found Jominy hard-



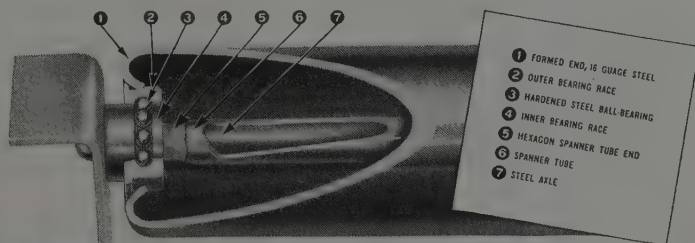
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enability testing of medium carbon alloy steels very useful—more useful as a rule than chemical analysis. It is less useful on carburizing grade steel. There is little trouble in substituting one alloy steel for another providing the substitute steel has equally great hardenability. We feel that carbon content has sometimes been undesirably low and should be high enough so that medium carbon alloy steel parts will be within the specified hardness range after tempering well above 800°F.

ACKNOWLEDGMENT

The author wishes to thank all members of Austin-Western heat treating and metallurgical departments for their loyal co-operation during the past hectic years, and particularly Mr. Wm. Siekman Jr., who has had charge of metallurgical testing on which this discussion is based.

Handling Bar Stock

(Concluded from Page 111)

distance between forks should be greater than width of scale. This permits forks to clear sides of scale when bars are placed on scale. After weight is recorded, forks are raised and bars taken off scale. If platform scales are used, pre-weighed skids or lengths of wood should be placed on scale so that when bars are dropped, there will be sufficient clearance between the bars and scale platform to permit truck forks to be withdrawn before load is weighed. After weighing, the truck forks are inserted between platform and bars, forks raised, and bars removed. If a platform scale of large capacity is used, the fork truck and load can be weighed together. If this is done, weight of truck should be known so that it can be deducted from gross weight.

The fork truck is especially valuable when bars are to be placed in racks. Truck with several bars on the forks may be driven parallel to rack with bars facing into desired section of rack. In this position, bars can be pushed in by hand. Larger bars may be dropped by fork truck on rollers placed in front of rack. Truck then faces bars and pushes them into rack. With special fixtures on forks, truck can rack bars as shown in Fig. 4. Here a specially designed bar-handling rig enables fork truck to carry bars into yard rack and push bars into racks. All heavy work is done by fork truck. Bracket at rear of the rig balances load against weight of truck.

Where spindle racks are used, bars can be racked a bundle at a time. Bundle is placed at end of forks, forks are raised over empty section of rack, and lowered between spindles. Ends of bars catch on spindles and forks drop free.

Hoists are one of the most useful types of bar stock handling equipment. Yard cranes, boom hoists, jib cranes, or car cranes, can be used. Value of the hoist lies in fact it can carry loads in and out of

places not accessible to fork trucks. However, since the hoist's power is for vertical lifting, it should not be used for any heavy sideways pulling.

A hoist can be dangerous in hauling bar stock, if care is not exercised. Precautionary steps should become routine. Two men should operate a hoist, one to guide and steer the hoist, the other to guide and steer load. Bars should be bundled before being moved. Load being carried should be considerably lighter than rated capacity of sling or chain. Load chain should always have a lower capacity than hoist chain or wire rope. Thus, if anything gives it will be the load chain and not the hoist itself. Load should always be as close to floor as is convenient for men moving it. It is dangerous to lift loads over racks, saws, and people. Loads should be headed down the aisle not across.

Hoists are useful not only in carrying bars from one place to another and in unloading bar stock from freight cars or trucks, but also in racking bar stock. Depending on type of hoist used, a number of racking operations can be accomplished: (1) Heavy bars can be put into racks by using a hoist alone. Bar is raised till it faces into rack. Hoist is then directed toward rack and bar carried into rack as far as it will go. Hoist is lowered to permit chains to be moved toward end of bar. Hoist is raised and bar pushed in. This is repeated till bar is in rack. (2) Flat or square stock can be handled like heavy bars. However, where several bars are being put into the rack at one time, bars should be held flat in a sling.

General Precautions

Bars should never be left flush on the floor. There must be space for gripping by hand, inserting a chain or sling, or for prongs of a fork truck. Wooden spacers should be made standard equipment where bars stock is stored. Adequate provision should be made to prevent bars from slipping or rolling. Where bars are on the floor on dunnage, upright wooden posts should be nailed on ends of blocks to prevent bars from rolling onto floor. Wagons and trucks for bar stock should have removable sides or stakes to prevent bars from spilling. When bars are carried on prongs of fork trucks, the prongs always should be tilted back. Bundles of bar stock should always be separately blocked, as it is very difficult to extract one bundle from the group where there is little room for insertion of a sling or chain. Rows of bars or bundles should be separated by lengths of board.

Under all circumstances where bar stock is being handled, great emphasis must be placed on safety.

Heat Treating Aluminum

(Continued from Page 79)

how much copper is in the still molten portion of the material. In fact, such diagrams are called constitutional diagrams.

First we extend a horizontal dotted line left from Point 3 to Curve B (which represents the temperature at which freezing is completed for the different compositions). Then from the point where we strike Curve B, we run a vertical line to the base. Here the copper scale tells us that the alloy that completes freezing out at 1160° F contains about 1¼ per cent copper. So now we know that at Point 3, the crystals forming at Point 3 contain 1¼ per cent copper.

To find the copper content of the still molten portion, we run a horizontal line to the right from Point 3 to Curve A—the curve that indicates the beginning of freezing. At the point where this line strikes Curve A is the amount of copper in the alloy just beginning to freeze. By extending a vertical line from this point on Curve A to the base scale, we find that the molten material contains about 15 per cent copper.

At lower temperatures (between Point 3 and Point 4), the crystals just forming will contain more and more copper. Likewise, the remaining molten material will also contain a greater percentage of copper. Thus as the temperature falls, the material freezing out of solution at any particular moment corresponds to the alloy of aluminum and copper that freezes at that particular temperature. This "differential freezing" was first pointed out under that heading in last week's article.

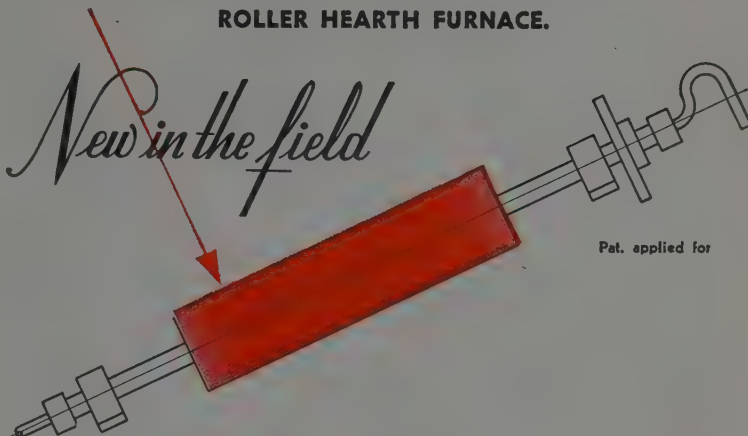
Thus at any point between Curve A and Curve B, we have a mixture of solid particles and still molten liquid. The solid particles consist of aluminum with a certain amount of copper dissolved in them. When one metal remains dissolved in another like this, the combination is called a "solid solution."

Diffusion: At Point 4, all the material has solidified. By extending a horizontal line to the right to Curve A, we note that the very last crystals to solidify contained about 26 per cent copper, while the very first crystals to solidify (at Point 2) contained practically pure aluminum. So at Point 4 we have grains whose center consists of almost pure aluminum crystals and whose extreme outer surface is formed of crystals having 26 per cent copper. The entire copper content or average throughout the entire grain, however, is 3 per cent, since we can have no more or no less than the 3 per cent with which we started.

Now let's go somewhat below Curve B to say 1018° F—Point 5—and hold

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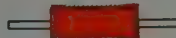
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the material at this temperature while we examine what is happening. At any position below Point 4, the material is a solid. But that does not mean that more changes do not occur.

To understand this last statement, we must go back to a fundamental. Any metal can exist in at least three different states—vapor, liquid or solid. In addition, many common metals appear in more than one solid form. These different forms are known as phases.

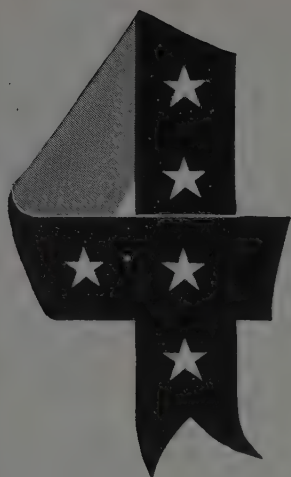
The aluminum-copper alloys we are studying have four phases—a completely liquid phase in the chart above Curve A, a second phase consisting of solid particles in molten material in the area between Curve A and Curve B, a third phase in the area below Curve B and to the left of Curve C where the material is a solid, and a fourth phase in the area below Curve B and to the right of Curve C where the material is also solid but in a different form as will be explained.

But let's get back to see what happens when we hold the temperature at Point 5—1018° F. At this comparatively high temperature, the phenomena we called solid diffusion (explained under homogenizing last week) proceeds at a comparatively rapid rate. This means that the fairly large amounts of copper near the grain boundaries diffuse rapidly inward throughout all portions of the grain so that it is not long before every crystal in the grain contains the same amount of copper—3 per cent in our example.

Point 5 can be said to be typical of any point between Point 4 and Point 6 in that anywhere in this range, the copper will diffuse throughout the entire structure if the temperature is held for a sufficient period of time. Of course, the diffusion progresses more rapidly at the higher temperatures, which means that a shorter period of time would be required for complete diffusion at those temperatures—again emphasizing the importance of time in the heat-treating cycle.

Precipitation: Curve C is the line indicating the beginning of the formation of a compound containing copper and aluminum called copper aluminide (CuAl_2). This compound starts to separate or precipitate out of the material at any temperature below Point 6—920° F for the 3 per cent alloy under consideration. This precipitation of a solid from out of another solid was mentioned previously in our discussion of precipitation.

At Point 7, more copper has separated out as copper aluminide. In fact at this temperature (around 850° F) about 99 per cent of the material is in the form of a copper aluminum alloy containing 2½ per cent copper, the remainder or other ½-per cent of copper being in the copper aluminide particles which have precipitated out of the copper-aluminum



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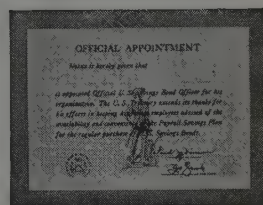
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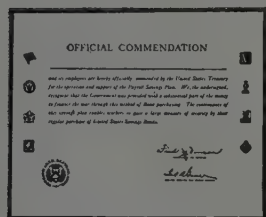
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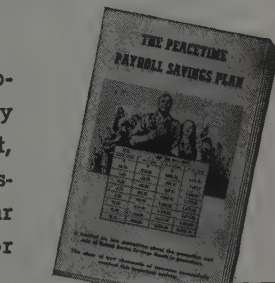
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alloy and now exists between crystals and between grains. The other 1 per cent of material is in the form of copper aluminide. This now contains about ½-per cent of the total amount of copper, which of course is still 3 per cent since we have not added or taken away any of the original copper. At Point 8, Fig. 12, still more copper has precipitated out in the form of copper aluminide.

To develop maximum strength in the aluminum alloys, it is necessary to control carefully the size and distribution of the material precipitated out as it is this material which affords the added strength (due to keying, etc.) as previously explained.

Controls, Quenching: Now let's examine how heat treatments are used for strengthening the aluminum alloys and see what controls are employed to bring about the proper size and distribution of the precipitated particles.

First step is to bring the aluminum alloy up to the specified temperature, which will lie somewhere between Curve B and Curve C on the constitution diagram for the particular alloy under consideration. A whole series of constitution diagrams for various aluminum alloys will be found in the *Metals Handbook*. A diagram for aluminum-copper alloys, similar to our Fig. 12, can be found there.

Purpose of this first step is to dissolve the precipitated constituents, so they can later be re-precipitated in the form wanted. The material must be held at the specified temperature for a sufficient period of time for this dissolving action to occur throughout all portions of the piece being treated. This maintaining "at temperature" for the specified length of time is called soaking and constitutes the second step in the heat-treating cycle.

The third step is to cool the work rapidly (quench) by plunging the part into cold water. Purpose of suddenly dropping the temperature of the part in this manner is to prevent certain constituents from precipitating out, which they would do if cooled slowly. Here slow cooling would also tend to produce a precipitate consisting of large particles instead of the type we want.

Quenching from any particular temperature range tends to retain in the metal the structure present just before quenching. Thus quenching not only prevents the precipitation of certain constituents that we do not want to precipitate at that time, but it also helps control the constituents that we do want out of solution.

Purpose of the entire heat-treating cycle is to develop the right kind of precipitate in the right place in the metal structure. The precipitate we want should be of the "gritty" type rather than the "ball

bearing" type, as previously explained, in order to provide the maximum resistance to slippage of crystals. Also the precipitate must be uniformly distributed in extremely minute particles between crystals where it can exert maximum keying effect, rather than outside the grains or along grain boundaries.

Aging: The fast cooling to near room temperature upon quenching produces a supersaturated condition where the material has already dissolved in it more of the constituents than it normally can carry in solution at that temperature. Such a condition obviously is unstable. The result is that certain constituents begin to separate out or precipitate from the main mass of the aluminum alloy.

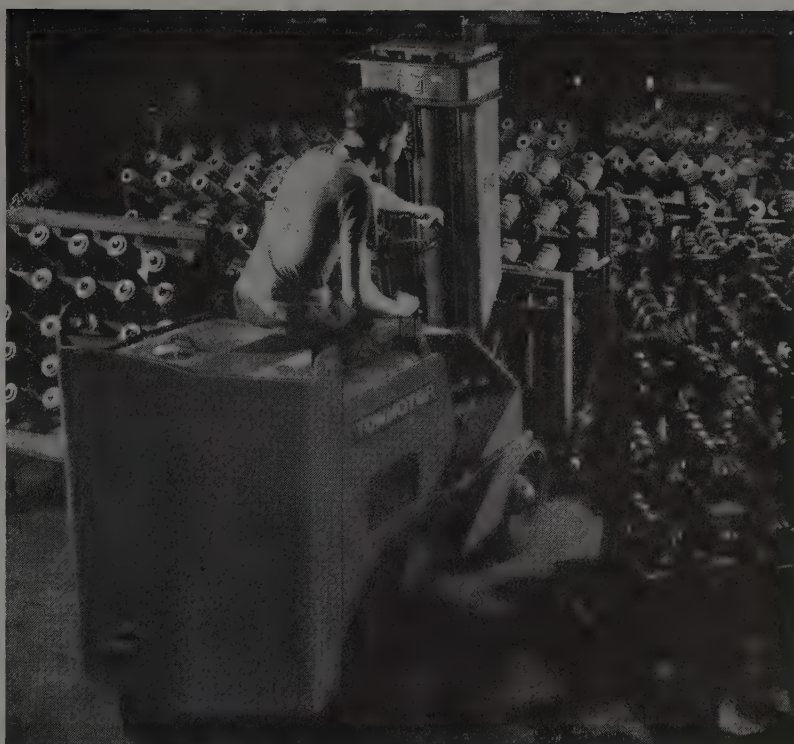
This precipitation occurs at room temperature with many of the aluminum alloys and this action then is known as natural aging. Certain other alloys must be heated slightly to bring this precipitation to completion within a reasonable length of time. This is called artificial aging. In either case, this controlled re-precipitation is aimed at providing the correct size, character and distribution of the precipitated particles in the aluminum to produce maximum strength and other mechanical properties that may be desired.

It should be pointed out that aluminum alloys hardened in this manner can be made soft and easily workable again by an annealing treatment. (However annealing alone will not produce maximum workability in aluminum alloys that have been heat treated, for additional cold working and subsequent re-annealing is required in these instances.) Recommended annealing cycles are designed to produce a precipitate in the form of large particles outside the grains along the grain boundaries and not inside between crystals. In this manner, minimum keying effect results and the material is "soft" because the crystals easily slip along their slip plates. This redistribution of the precipitate is in addition to the re-crystallization effect mentioned in our first discussion of annealing, that appeared in the first part of this article last week.

It will be evident from the explanation presented here that it is necessary to follow closely the recommended heat-treating cycles in order to produce maximum mechanical properties in the aluminum alloy. Even slight variations from the recommendations can cause considerable difficulty.

Recommended heat-treating cycles for the various aluminum alloys will be found in Parts IV and V, as will a more technical discussion of these heat treatments and information on possible difficulties and their solution.

(To be continued next week)



Geared-To Capacity Production

MILLIONS OF GEARS—gears of many sizes and shapes, for a large variety of uses—are produced by Warner Gear Division, Borg-Warner Corporation. Mass production of this sort entails numerous handling problems, many of which are effectively solved by a fleet of eleven Towmotors.

On receiving docks, a single Towmotor handles all types of raw materials including 18-foot bar stock, keeps materials flowing to production departments. In the shop, Towmotors tier 5600-lb. loads three high to triple storage space, provide a simple answer to the perplexing problem of transporting 1200-lb. cyanide pots from heat-treating to storage. One unit often does the work of a ten-man gang.

In the shipping department, two Towmotors load 250,000

lbs. of gears daily, in addition to supplying loads for three interplant trucks. And to Towmotor's record for versatility and capacity can be added economical operation... operating costs for each unit total only $\frac{1}{4}$ of the operator's wage.

For every handling problem, however unusual, there is an engineered solution... a solution based on Towmotor experience and "know-how" gained in solving handling problems in every industry. Send for your copy of the Towmotor Lift Truck ANALYSIS GUIDE today. Towmotor Corporation, 1223 East 152nd Street, Cleveland 10, Ohio.

**TAKE IT UP WITH
TOWMOTOR
THE ONE-MAN-GANG**

The Business Trend

Production Edges Up to Another Postwar High

GAINS in steel ingot, automobile, and electric power production, pushed STEEL's industrial activity to a new postwar high mark of 152 per cent (preliminary) in the week ended Aug. 17. This is a rise of 2 points over the previous week.

In making gains, both steel ingot and automobile production reached new postwar levels. Steel ingot output was at 90 per cent of capacity, and automobile production totaled 88,560 passenger cars and trucks, compared with 77,825 in the week ended Aug. 10 and the previous postwar high mark of 84,720 in the week ended July 27.

Reflecting the uptrend in industrial production, electric power output in the week ended Aug. 17 also reached a new postwar high level.

Although the trend of industrial production has been upward, industrialists are keeping an apprehensive eye on the Great Lakes maritime strike in an effort to foresee its ultimate effect on industry as a whole.

COAL—Continued high output of bituminous coal is whittling down the production deficit incurred during the miners' strike a few months ago, with the result that output this year through Aug. 10 is only 16.4 per cent below that for the corresponding period in 1945. Weekly production is running close to 12½ million tons.

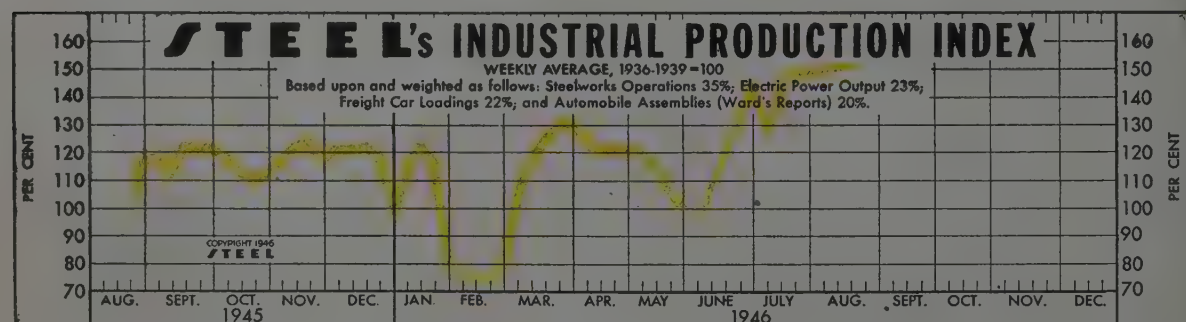
PRICES—Inflationary movement of prices pushed the

U. S. Bureau of Labor Statistics index of wholesale prices in the week ended Aug. 10 up to 127.1 per cent of the 1926 average. The current level is 20.5 per cent higher than at the end of the war. During the past two weeks, the index has advanced 2.4 per cent.

COST OF LIVING—The cost of living rose 1.4 per cent between Mar. 15 and June 15 and is now higher than at any time since January, 1921, according to the National Industrial Conference Board.

BUILDING—The estimated value of building permits issued in 215 cities turned upward in July, following three successive monthly declines, Dun & Bradstreet Inc. reported. Aggregate permit valuations in July were 10.8 per cent above those of June and 140 per cent higher than those of July, 1945. The approximate value of permits taken out in the 215 cities during the first seven months of 1946 was \$1,700,819,182, the largest for any similar period since 1929 and almost three and one-half times the construction volume for the corresponding period of 1945.

RAILROADS—Advance reports from 86 Class I railroads, whose revenues represent 80.2 per cent of total operation revenues, indicate that railroad operating revenues in July decreased 16 per cent under that month in 1945, according to the Association of American Railroads. This estimate covers only operating revenues and does not touch upon operating expenses, taxes, or final income results. Estimated freight revenues in July, 1946, were less than in July, 1945, by 13.1 per cent, while estimated passenger revenues decreased 26.4 per cent.



The Index (see chart above):

Latest Week (preliminary) 152

Previous Week 150

Month Ago 148

FIGURES THIS WEEK

INDUSTRY

	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)§	90	89	88	60
Electric Power Distributed (million kilowatt hours)	4,122	4,412	4,293	3,939
Bituminous Coal Production (daily av.—1000 tons)	2,050	2,012	2,116	1,915
Petroleum Production (daily av.—1000 bbls.)	4,843	4,821	4,917	4,934
Construction Volume (ENR—100 \$1,000,000)	\$129.1	\$119.6	\$121.6	\$49.1
Automobile and Truck Output (Ward's—number units)	88,560	77,825	80,985	11,205

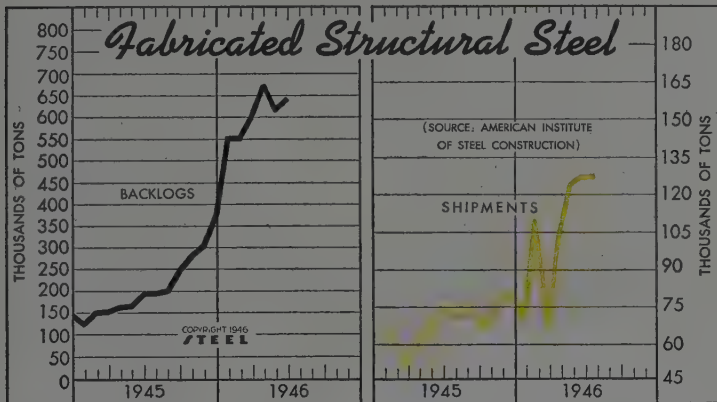
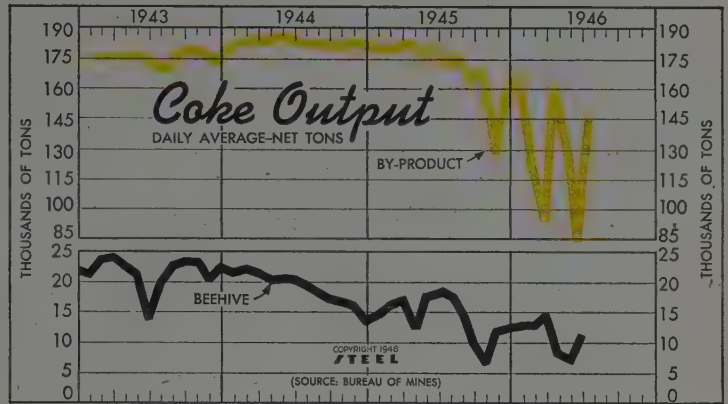
*Dates on request. §1946 weekly capacity is 1,762,381 net tons. 1945 weekly capacity was 1,831,636 net tons.

TRADE

Freight Carloadings (unit—1000 cars)	907½	899	921	653
Business Failures (Dun & Bradstreet, number)	17	27	25	5
Money in Circulation (in millions of dollars)†	\$28,353	\$28,326	\$28,211	\$27,351
Department Store Sales (volume from like wk. a yr. ago)‡	+29%	+30%	+26%	-17%

†Preliminary. ‡Federal Reserve Board.

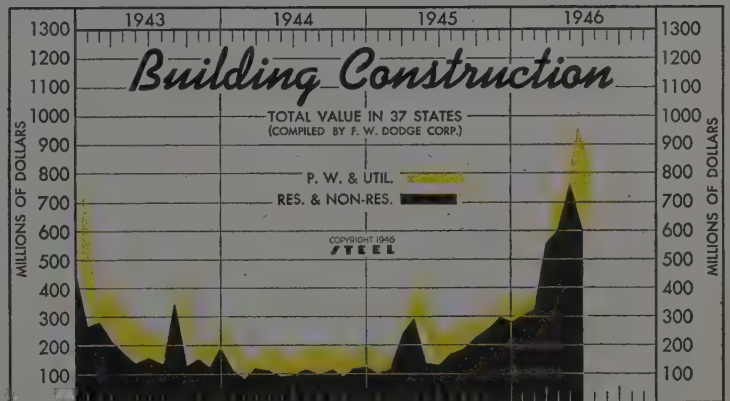
Coke Output				
Bureau of Mines				
(Daily Average—Net Tons)				
	By-Product		Beehive	
	1946	1945	1946	1945
Jan.	122,570	179,879	13,089	14,745
Feb.	93,985	180,727	13,064	16,210
Mar.	161,290	182,120	14,897	17,115
Apr.	128,394	174,239	811	12,554
May	83,019	178,338	708	17,963
June	146,583	172,201	11,359	18,616
July ....	.....	175,163	.....	17,682
Aug. ....	.....	163,587	.....	14,669
Sept. ....	.....	166,559	.....	9,924
Oct. ....	.....	127,173	.....	6,407
Nov. ....	.....	159,646	.....	12,218
Dec. ....	.....	166,648	.....	12,859
Ave.	168,855	.....	14,230	.....



Fabricated Structural Steel							
(000 Tons)							
	Shipments			Backlogs			
	1946	1945	1944	1946	1945	1944	
Jan.	107.5	57.0	35.2	552	124.4	118.1	
Feb.	63.8	49.0	42.9	551	151.6	117.6	
Mar.	102.8	59.5	41.4	605	158.3	106.3	
Apr.	122.3	62.8	44.5	674	162.5	111.2	
May	124.0	72.6	50.7	615	165.7	116.3	
June	124.1	69.2	43.0	642	195.2	122.7	
July ....	.....	69.9	45.3	.....	194.0	125.4	
Aug. ....	.....	70.6	55.2	.....	201.1	130.4	
Sept. ....	.....	63.4	57.5	.....	248.5	151.1	
Oct. ....	.....	76.6	61.6	.....	282.8	174.4	
Nov. ....	.....	78.0	59.4	.....	304.9	184.2	
Dec. ....	.....	68.8	61.3	.....	375.2	142.5	
Total	797.4	597.9	.....	.....	.....	.....

Construction Valuation in 37 States
(Unit—\$1,000,000)

	Public Works—Utilities		Residential and Non-Residential	
	1946	1945	1946	1945
Jan.	357.5	50.2	39.8	307.3
Feb.	367.4	64.7	32.0	322.7
Mar.	697.6	143.6	90.6	554.0
Apr.	734.9	128.1	111.9	606.8
May	952.4	197.9	107.9	751.6
June	807.9	.....	95.0	605.5
July ....	.....	.....	89.9	167.8
Aug. ....	.....	.....	77.5	186.1
Sept. ....	.....	.....	54.6	223.6
Oct. ....	.....	.....	61.1	255.5
Nov. ....	.....	.....	74.0	296.0
Dec. ....	.....	.....	51.0	279.7
Total ....	.....	885.3	.....	2,414.0



FINANCE

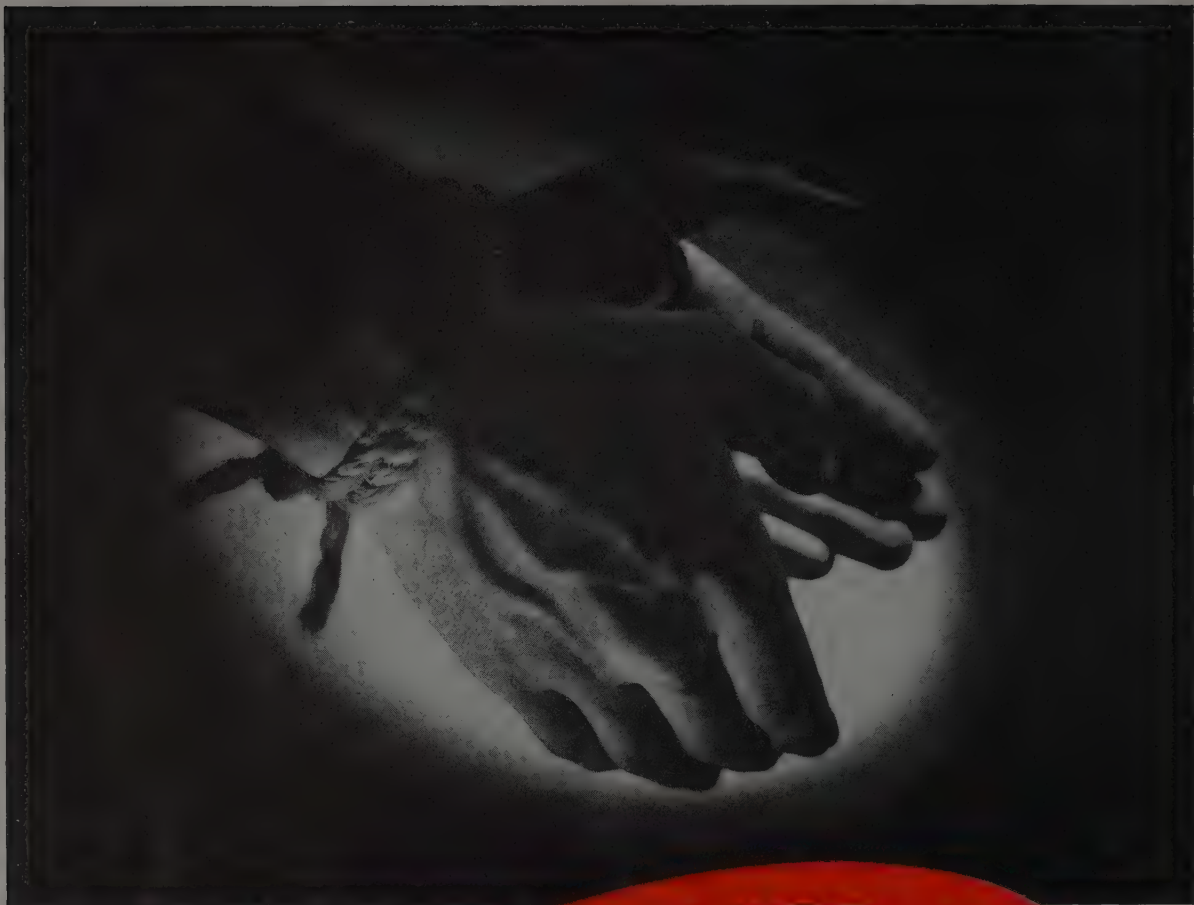
	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	\$11,092	\$11,791	\$13,076	\$7,865
Federal Gross Debt (billions)	\$267.7	\$267.5	\$268.3	\$263.0
Road Volume, NYSE (millions)	\$17.4	\$15.6	\$17.8	\$18.1
Stocks Sales, NYSE (thousands)	3,747	4,102	4,660	3,096
Loans and Investments (billions)†	\$59.8	\$60.7	\$60.6	\$63.1
United States Gov't. Obligations Held (millions)†	\$41,454	\$42,296	\$42,185	\$46,771

†Member banks, Federal Reserve System.

PRICES.

	\$64.45	\$64.45	\$64.45	\$59.27
STEEL's composite finished steel price average	127.1	125.0	120.7	105.7
All Commodities†	115.7	140.6	137.2	117.7
Industrial Raw Materials†	121.3	120.6	115.3	102.0
Manufactured Products† .....	.....	.....	.....	.....

†Bureau of Labor Statistics Index, 1926 = 100.



Our hands are TIED, too!

There's no secret about the fact that reconversion has hit serious snags. There's no one in industry that has escaped the chain of events which tied our hands.

Back in '41 and '42, and all during the war emergency, Levinson Steel Sales was able to maintain fairly comprehensive inventories. By anticipating requirements we were usually in position to adequately serve our customers in war industries.

But in the present situation we have had no such opportunity. As with others in our industry, our inventory is at its lowest ebb. Hence we cannot offer our customers the usual wide range of items which they have been accustomed to expect from us.

We ask only that you understand our position, and that you believe us when we say *we are striving to do our very best under unusual conditions.*

LEVINSON STEEL SALES COMPANY

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STRUCTURAL SHAPES • PLATES • CHECKER PLATES • SHEETS • STRIP • HOT ROLLED AND COLD FINISHED BARS
REINFORCING BARS... also APS PLASTEEL ROOFING • BATES OPEN STEEL FLOORING • THORN STEEL WINDOWS

Steel Supply to Consumers Better Despite Shortages

Lack of scrap and pig iron threaten to cut down present high rate but mills continue to hold position . . . Some prices are advanced

ALTHOUGH steel producers generally are still well behind on their commitments, flow of steel to consumers and jobbers is at peak for the year to date. How much longer present rate of shipments will be maintained or increased, will depend in large measure on supply of raw materials, particularly scrap, and the outlook is not promising. With overall supply of these materials as acute as ever and with consumers' stocks at the lowest point reached since before the war indications point to a decline in steel production unless new remedial measures can be applied promptly, especially with regard to scrap, on the price of which dealers and Washington continue at odds.

Plate production in some districts, curtailed for weeks because of pig iron and scrap shortages, has declined further and an important producer now operating at 40 to 50 per cent is considering suspending entirely within a week or two.

The situation in pig iron shows some signs of betterment, temporarily at least, with two eastern stacks changing from foundry grades to basic, giving steel mills in that area a better supply of iron. At the same time scrap supply is smaller.

Maritime Commission has definitely advised shipbuilders of the abandonment of plans to go ahead on construction of two superliners for the Pacific trade. Bids were to have been taken Sept. 20, each ship to take 18,000 tons of steel, including 12,000 tons of plates. Also plans for going ahead at present on three liners for the Mediterranean trade, on which Bethlehem Steel Co. is low, have been given up.

In spite of difficulties in maintaining production in the face of shortages the industry is maintaining a high level. The estimated national rate for last week receded only 1

DISTRICT STEEL RATES

(Percentage of Ingot Capacity Engaged in Leading Districts)

	Week Ended Aug. 24	Change	Same Week 1945	Same Week 1944
Pittsburgh	97	— 1.5	50	90.5
Chicago	92.5	None	80.5	97.5
Eastern Pa.	81	None	70	93.5
Youngstown	88	None	72	92
Wheeling	85	— 8.5	96	92
Cleveland	90	— 1.5	77	90
Buffalo	86	— 2.5	62.5	90.5
Birmingham	93	— 6	95	95
New England	86	— 4	78	80
Cincinnati	84	— 5	86	88
St. Louis	54.5	None	65	87
Detroit	86	— 4	81	82
Estimated national rate	89	— 1	70	95

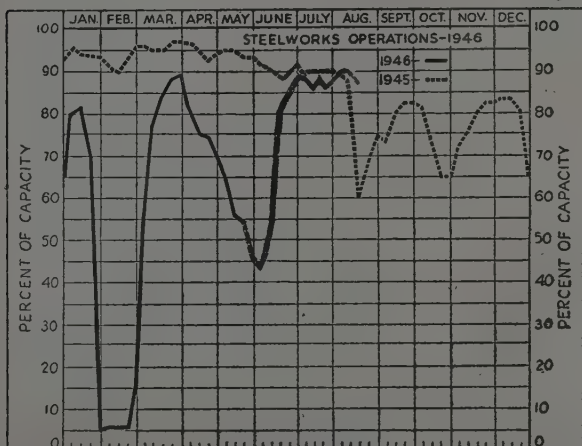
Based on weekly steelmaking capacity of 1,762,381 net tons for 1946; 1,831,636 tons for 1945; 1,791,287 tons for 1944.

point to 89 per cent of capacity, after establishing a high the prior week, best since July of last year. Eight of the districts showed slight declines, in most cases because of necessity for furnace repair, though some resulted from lack of scrap and pig iron. Pittsburgh declined 1½ points to 97 per cent, Cleveland 1½ points to 90, Buffalo 2½ points to 86, Wheeling 8½ points to 85, Detroit 4 points to 86, Cincinnati 5 points to 84, Birmingham 6 points to 93 and New England 4 points to 86. Unchanged rates were maintained at Chicago 92½ per cent, Youngstown 88, St. Louis 54½, eastern Pennsylvania 81 and West Coast 84.

Prices of fire clay, silica and ladle brick have been advanced \$4 to \$6 per thousand to make up for increased manufacturing costs, as OPA control has been lifted. Prices on magnesite and basic brick continue unchanged from recent levels. Office of Price Administration has allowed an increase of \$1.75 per ton on soil pipe, which producers say takes this product out of the red by a slight margin. On revival of OPA the price was rolled back to the June 30 level and this resulted in relatively little being produced. As this product is important in the housing program the price relief was granted to assure larger supply.

Maximum operation of the Great Lakes fleet during the remainder of the season will be necessary to assure an adequate supply of iron ore to carry the industry over to the opening of the shipping season next spring. Any serious interruption due to the Maritime Union's strike could result in a shortage. However, stocks of Lake Superior ore at furnaces and docks on Aug. 1 were slightly higher than a year ago, being 30,438,615 gross tons, compared with 29,485,221 tons at the same date last year. Consumption is increasing, that of July being 6,423,035 tons, compared with 4,994,936 tons in June and nearly equal to the 6,532,273 tons smelted in July, 1945.

With OPA ceilings unchanged, average composite prices of iron and steel products are steady at the levels prevailing the past few weeks. Finished steel composite is \$64.45, semifinished steel \$40.60, steelmaking pig iron \$27.50 and steelmaking scrap \$19.17.



COMPOSITE MARKET AVERAGES

	Aug. 24	Aug. 17	Aug. 10	One Month Ago July, 1946	Three Months Ago May, 1946	One Year Ago Aug., 1945	Five Years Ago Aug., 1941
Finished Steel	\$64.45	\$64.45	\$64.45	\$64.45	\$63.54	\$58.27	\$56.73
Semifinished Steel	40.60	40.60	40.60	40.60	40.60	37.80	36.00
Steelmaking Pig Iron	27.50	27.50	27.50	27.50	25.50	24.00	23.00
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Material

	Aug. 24, 1946	July, 1946	May, 1946	Aug., 1945
Steel bars, Pittsburgh	2.50c	2.50c	2.50c	2.25c
Steel bars, Philadelphia	2.86	2.86	2.82	2.57
Steel bars, Chicago	2.50	2.50	2.50	2.25
Shapes, Pittsburgh	2.35	2.35	2.35	2.10
Shapes, Philadelphia	2.48	2.48	2.465	2.215
Shapes, Chicago	2.35	2.35	2.35	2.10
Plates, Pittsburgh	2.50	2.50	2.50	2.25
Plates, Philadelphia	2.50	2.558	2.55	2.30
Plates, Chicago	2.50	2.50	2.50	2.25
Sheets, hot-rolled, Pittsburgh	2.425	2.425	2.425	2.20
Sheets, cold-rolled, Pittsburgh	3.275	3.275	3.275	3.05
Sheets, No. 24 galv., Pittsburgh	4.05	4.05	4.05	3.70
Sheets, hot-rolled, Gary	2.425	2.425	2.425	2.20
Sheets, cold-rolled, Gary	3.275	3.275	3.275	3.05
Sheets, No. 24 galv., Gary	4.05	4.05	4.05	3.70
Hot-rolled strip, over 6 to 12-in., Pitts.	2.35	2.35	2.35	2.10
Cold-rolled strip, Pittsburgh	3.05	3.05	3.05	2.80
Bright basic, best, wire, Pittsburgh	3.05	3.05	3.05	2.75
Wire nails, Pittsburgh	3.75	3.75	3.25	2.90
Tin plate, per base box, Pittsburgh	\$5.25	\$5.25	\$5.25	\$5.00

Semifinished Material

	Aug. 24, 1946	July, 1946	May, 1946	Aug., 1945
Sheet bars, Pittsburgh, Chicago	\$38.00	\$38.00	\$38.00	\$36.00
Slabs, Pittsburgh, Chicago	39.00	39.00	39.00	38.00
Rerolling billets, Pittsburgh	39.00	39.00	39.00	38.00
Wire rods, No. 5 to $\frac{1}{2}$ -inch, Pitts.	2.30c	2.30c	2.30c	2.15c

Pig Iron

	Aug. 24, 1946	June, 1946	Apr., 1946	July, 1945
Bessemer del. Pittsburgh	\$29.77	\$29.69	\$27.69	\$26.19
Basic, Valley	28.00	28.00	26.00	24.50
Basic, eastern del. Philadelphia	29.93	29.93	27.84	26.34
No. 2 fdry., del. Pgh. N. & S. sides	29.27	29.19	27.19	25.69
No. 2 foundry, Chicago	28.50	28.50	26.50	25.00
Southern No. 2, Birmingham	24.88	24.88	22.88	21.38
Southern No. 2 del. Cincinnati	28.94	28.94	26.94	25.44
No. 2 fdry., del. Philadelphia	30.43	30.43	28.34	26.84
Malleable, Valley	28.50	28.50	26.50	25.00
Malleable, Chicago	28.50	28.50	26.50	25.00
Charcoal, low phos., fob Lyles, Tenn.	33.00	33.00	33.00	33.00
Gray forge, del. Pittsburgh	28.69	28.69	26.69	25.19
Ferromanganese, fob cars, Pittsburgh	140.00	140.00	140.00	140.33

Scrap

	Aug. 24, 1946	June, 1946	Apr., 1946	July, 1945
Heavy melting steel, No. 1, Pittsburgh	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt, steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke

	Aug. 24, 1946	June, 1946	Apr., 1946	July, 1945
Connellsville, furnace ovens	\$8.75	\$8.75	\$7.50	\$7.50
Connellsville, foundry ovens	8.62½	9.50	8.25	8.25
Chicago, by-product fdry., del.	15.10	15.10	13.75	13.67

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 per cent federal tax on freight. Pricing on rails was changed to net ton basis as of Feb. 15 1946.

Semifinished Steel

Carbon Steel Ingot: Fob mill base, rerolling quality, standard analysis, \$33.

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop, \$48.69.

Rerolling, Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, \$39; Detroit, del., \$41; Duluth (billets), \$41; Pac. ports (billets), \$51. (Andrews Steel Co., carbon slabs, \$41; Northwestern Steel & Wire Co., \$41; Sterling, Ill.; Granite City Steel Co., \$47.50 gross tons slabs from D.P.C. mill. Geneva Steel Co., \$58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, \$47; Detroit, del., \$49; Duluth, billets, \$49; forging billets fob Pac. ports, \$59.

(Andrews Steel Co. may quote carbon forging billets \$50 gross ton at established basing points; Follansbee Steel Corp., \$49.50 fob Toronto, O.; Geneva Steel Co., \$64.64, Pacific ports.)

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, \$58.43; del. Detroit \$60.43; eastern Mich. \$61.43.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, \$38. (Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, \$39, fob mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, Ib, 2.05c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5— $\frac{1}{2}$ in. inclusive, per 100 lb, \$2.30. Do., over $\frac{1}{2}$ — $\frac{3}{4}$ in., incl., \$2.45; Galveston, base, \$2.40 and \$2.55, respectively. Worcester add \$0.10; Pacific ports \$0.50.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham base, 20 tons one size, 2.50c; Duluth, base, 2.60c; Detroit, del., 2.60c; eastern Mich., 2.65c; New York, del., 2.86c; Phila., del., 2.86c; Gulf ports, dock, 2.85c; Pac., ports, dock, 3.15c. (Sheffield Steel Corp. may quote 2.75c, fob St. Louis; Joslyn Mfg. & Supply Co., 2.55c, fob Chicago.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.92c; Detroit, del., 3.02c. (Texas Steel Co. may use Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	\$0.108	4300	\$1.839
2300	1.839	4600	1.236
2500	2.759	4800	2.326
3000	0.541	5100	0.379
3100	0.920	5130 or 5152	0.494
3200	1.461	6120 or 6152	1.028
		6145 or 6150	1.296
3400	3.462	8612	0.703
4000	0.487	8720	0.737
4100 (15-.25 Mo) 0.757		9830	1.407
(.20-.30 Mo) 0.812			

* Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.10c; Detroit, 3.15c; Toledo, 3.25c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 3.625c; Detroit, del., 3.725c, eastern Mich., 3.75c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.35c;

Detroit, del., 2.45c; eastern Mich. and Toledo, 2.50c; Gulf ports, dock, 2.70c; Pacific ports, dock, 2.75c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.35c; Detroit, del., 2.45c; eastern Mich. and Toledo, del., 2.50c; Gulf ports, dock, 2.70c.

Iron Bars: Single refined, Pitts., 4.76c; double refined, 5.84c; Pittsburgh, staybolt, 6.22c; Terre Haute, single ref., 5.42c; double ref., 6.76c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base, 2.425c; Granite City, base, 2.525c; Detroit, del., 2.525c; eastern Mich., del., 2.575c; Phila., del., 2.615c; New York, del., 2.685c; Pacific ports, 2.975c. (Andrews Steel Co. may quote hot-rolled sheets for shipment to the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 3.00c on hot carbon sheets, Sparrows Point, Md.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.275c; Granite City, base, 3.375c; Detroit, del., 3.375c; eastern Mich., del., 3.425c; New York, del., 3.615c; Phila., del., 3.635c; Pacific ports, 3.925c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 4.05c; Granite City, base, 4.15c; New York, del., 4.31c; Phila., del., 4.24c; Pacific ports, 4.60c.

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29-gage, per square, 3.73c. Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16-gage not corrugated, copper alloy, 4.15c; Granite City, 4.25c; Pacific ports, 4.60c; copper iron, 4.50c; pure iron, 4.50c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.60c.

Aluminized Sheets, 20 gage: Pittsburgh, hot-dipped, coils or cut to lengths, 9.60c.

Enameling Sheets: 10-gage: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.20c; Granite City, base, 3.80c; Detroit, del., 3.30c; eastern Mich., 3.35c; Pacific ports, 3.85c; 20-gage: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.80c; Detroit, del., 3.90c; eastern Mich., 3.95c; Pacific ports, 4.45c.

Electrical Sheets No. 24:			
	Pittsburgh	Pacific	Granite City
Field grade	3.90c	4.65c	4.00c
Armature	4.25c	5.00c	4.35c
Electrical	4.75c	5.50c	4.85c
Motor	5.425c	6.175c	5.525c
Dynamo	6.125c	6.875c	6.225c
Transformer			

72	6.625c	7.375c	
65	7.625c	8.375c	
58	8.125c	8.875c	
52	8.925c	9.675c	

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, 6-in. and narrower: Base, 2.45c; Detroit, del., 2.55c; eastern Mich., del., 2.60c; Pacific ports, 3.10c. (Superior Steel Corp. may quote 3.30c, Pitts.)

Over 6-in.: Base, 2.35c; Detroit, del., 2.45c; eastern Mich., del., 2.50c; Pacific ports, 3.00c. (Superior Steel Corp. may quote 3.20c, Pitts.)

Cold-Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less, 3.05c; Chicago, base, 3.15c; Detroit, del., 3.15c; eastern Mich., del., 3.20c; Worcester, base, 3.25c. (Superior Steel Corp. may quote 4.70c, Pitts.)

Cold-Finished Spring Steel: Pittsburgh, Cleveland base, 0.26-0.50 carbon, 3.03c. Add 0.20c for Worcester.

Tin, Terne Plate

(OPA ceiling prices announced March 1, 1946.)
Tin Plate: Pittsburgh, Chicago, Gary, 100-lb base box, \$5.25; Granite City, Birmingham, Sparrows Point, \$5.35.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb base box, 0.25 lb tin, \$4.60; 0.50 lb tin, \$4.75; 0.75 lb tin, \$4.90; Granite City, Birmingham, Sparrows Point, \$4.70, \$4.85, \$5.00, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29-gage and lighter, 3.30c; Granite City, Birmingham, Sparrows Point, 3.40c; Pacific ports, boxed, 4.30c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted, 4.05c; Pacific ports, 4.80c. **Manufacturing Ternes (Special Coated):** Pittsburgh, Chicago, Gary, 100-base box, \$4.55; Granite City, Birmingham, Sparrows Point, \$4.65.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I. C. 8-lb \$12.50; 15-lb \$14.50; 20-lb \$15.50 (nom.); 40-lb \$20.00 (nom.)

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.50c; New York, del., 2.71c; Phila., del., 2.558c; St. Louis, 2.74c; Boston, del., 2.86c; Pacific ports, 3.05c; Gulf ports, 2.85c.

(Granite City Steel Co. may quote carbon plates 2.65c fob D.P.C. mill; Geneva Steel Co., Provo, Utah, 3.20c fob Pac. ports; Central Iron & Steel Co., Harrisburg, Pa., 2.80c, basing points; Lukens Steel Co., Coatesville, Pa., 2.75c, base; Worth Steel Co., Claymont, Del., 2.60c, base; Alan Wood Steel Co., Conshohocken, Pa., 2.75c base.)

Floor Plates: Pittsburgh, Chicago, 3.75c; Pacific ports, 4.40c; Gulf ports, 4.10c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.787c; Gulf ports, 4.273c; Pacific ports, 4.49c.

Clad Steel Plates: Coatesville, 10% cladding: monel-clad, 18.72c; inconel-clad, 26.00c; monel-clad, 24.96c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.35c; New York, del., 2.54c; Phila., del., 2.48c; Pacific ports, 3.00c; Gulf ports, 2.70c.

(Phoenix Iron Co., Phoenixville, Pa., may quote the equivalent of 2.60c, Bethlehem, Pa., on the general range and 2.70c on beams and channels from 4 to 10 inches.)

Steel Piling: Pittsburgh, Chicago, Buffalo, 2.65c; Pacific ports, 3.20c.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham, per 100 pounds)

Wire to Manufacturers in carloads	
Bright basic or bessemer	\$3.05
Spring (except Birmingham)	\$4.00
Wire Products to Trade	
Nails and staples	
Standard and cement-coated	\$3.75
Galvanized	\$3.40
Wire, Merchant Quality	
Annealed	\$3.50
Galvanized	\$3.85

(Fob Pittsburgh, Chicago, Cleveland, Birmingham, per base column)

Woven fence, 15½ gage and heavier	72
Barbed wire, 80-rod spool	**79
Barless wire, twisted	**79
Fence posts	74
Bale ties, single loop	72½

*Add \$0.10 for Worcester, \$0.05 for Duluth and \$0.50 for Pacific ports.

†Add \$0.30 for Worcester, \$0.50 for Pacific ports. Nichols Wire & Steel may quote \$4.25; Pittsburgh Steel Co., \$4.10.

‡Add \$0.50 for Pacific ports.

§Add \$0.10 for Worcester; \$0.70 Pacific ports. **Pittsburgh Steel Co. may quote 89.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about \$200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld					
Steel			Iron		
In.	Blk.	Galv.	In.	Blk.	Galv.
1/8	53	30	1/8	21	0½
3/8 & 1/2	56	37½	3/8	27	7
5/8	60½	48	1-1/8	31	13
3/4	63½	52	1½	35	15½
1-3	65½	54½	2	34½	15
Lap Weld					
Steel			Iron		
In.	Blk.	Galv.	In.	Blk.	Galv.
2	58	46½	1¼	20	0½
2½-3	61	49½	1½	25½	7
3½-6	63	51½	2	27½	9
7-8	62	49½	2½-3½	28½	11½
9-10	61½	49	4	30½	15
11-12	60½	48	4½-8	29½	14
			9-12	25½	9

—Seamless—					
Hot Rolled			Elec. Weld—		
O.D. sizes	B.W.G.	Hot Rolled	Hot Rolled	Cold Rolled	Cold Rolled
1".....	13	\$9.90	\$9.36	\$9.65	
1¼".....	13	11.73	9.63	11.43	
1½".....	13	\$10.91	12.96	10.63	12.64
1¾".....	13	12.41	14.75	12.10	14.37
2".....	13	13.90	16.52	13.53	16.19
2¼".....	13	15.50	18.42	15.08	18.03
2½".....	12	17.07	20.28	16.87	19.83
2¾".....	12	18.70	22.21	18.11	21.68
3".....	12	19.82	23.54	19.17	22.95
3½".....	12	20.79	24.71	20.05	24.02
3¾".....	11	26.24	31.18	25.30	30.29
4".....	10	32.56	38.68	31.32	37.52
4½".....	9	43.16	51.29		
5".....	9	49.96	59.36		
6".....	7	76.71	91.14		

Boiler Tubes: Net base prices per 100 feet fob Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

Pipe, Cast Iron: Class B, 6-in. and over, \$60 per net ton, Birmingham; \$65, Burlington, N. J.; \$62.80, del., Chicago; 4-in. pipe, \$5 higher. Class A pipe, \$3 a ton over class B.

Rails, Supplies

Standard rails, over 60-lb, fob mill, net ton, \$43.40. Light rails (billet), Pittsburgh, Chicago, Birmingham, net ton, \$49.18.

Relaying rails, 35 lb and over, fob railroad and basing points, \$31-\$33. **Supplies:** Track bolts, 6.50c; heat treated, 6.75c. Tie plates \$51 net ton, base, Standard spikes, 3.65c.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago. Additional discounts: 5 for carloads; 10 for full containers, except tire, step and plow bolts.

(Celling prices advanced 12 per cent, effective July 27, 1946; discounts remain unchanged.)

Carriage and Machine		
¾ x 6 and smaller	65½ off	
Do., ¾ and ¾ x 6-in. and shorter	63½ off	
Do., ¾ to 1 x 6-in. and shorter	61 off	
1½ and larger, all lengths	59 off	
All diameters, over 6-in. long	59 off	
Tire bolts	50 off	
Step bolts	56 off	
Plow bolts	65 off	

Stove Bolts
In packages, nuts separate, 71-10 off, nuts attached, 71 off; bulk, 80 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts		
Semifinished hex	U.S.S.	S.A.E.
¾-in. and smaller	62	64
1/2-in. and smaller	62	60
1/4-in.-1-in.	59	60
1½-in.-1½-in.	57	58
1½-in. and larger	56	
Additional discount of 10 for full kegs.		
Hexagon Cap Screws		
Upset 1-in., smaller	64 off	
Milled 1-in., smaller	60 off	
Square Head Set Screws		
Upset 1-in. and smaller	71 off	
Headless, ¾-in. and larger	60 off	
No. 10 and smaller	70 off	

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham
Structural 4.75c
¾-inch and under *65-5 off
*Plus 12 per cent increase on base prices, effective July 26.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, 1c1 \$2.75-\$3.00 off

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 15.15c; extra carbon 19.48c; special carbon 23.80c; oil-hardening 25.97c; high carbon-chromium 46.53c.

W	Cr.	V.	Mo.	Base, per lb.
18.00	4	1		72.49c
1.5	4	1	8.5	58.48c
	4	2	3	58.43c
6.40	4.15	1.90	5	62.22c
5.50	4.50	4	4.50	75.74c

Stainless Steels

Base, Cents per lb					
CHROMIUM NICKEL STEELS					
	Bars	Plates	Sheets	H.R. Strip	C.R. Strip
302.....	25.96c	29.21c	36.79c	23.93c	30.30c
303.....	28.13	31.38	38.95	29.21	35.71
304.....	27.05	31.38	38.95	25.45	32.46
308.....	31.38	36.79	44.36	30.84	37.87
309.....	38.95	43.28	50.85	40.03	50.85
310.....	53.02	56.26	57.35	52.74	60.59
312.....	38.95	43.28	53.02		
*316.....	43.28	47.61	51.94	43.28	51.94
\$321.....	31.38	36.79	44.36	31.65	41.12
1347.....	35.71	41.12	48.69	35.71	45.44
431.....	20.56	23.80	31.38	18.94	24.35

STRAIGHT CHROMIUM STEEL

403.....	23.93	26.51	31.92	22.99	29.21
*410.....	20.02	23.93	28.67	18.39	23.80
416.....	20.56	23.80	29.21	19.75	25.45
†420.....	25.96	30.84	36.25	25.70	39.49
430.....	20.56	23.80	31.38	18.94	24.35
†430F.....	21.10	24.35	31.92	20.29	26.51
440A.....	25.96	30.84	36.25	25.70	39.49
442.....	24.35	27.59	35.17	25.96	34.62
443.....	24.35	27.59	35.17	25.96	34.62
446.....	29.76	33.00	39.49	37.87	56.26
501.....	8.66	12.98	17.04	12.98	18.39
502.....	9.74	14.07	18.12	14.07	19.48

STAINLESS CLAD STEEL (20%)
(Fob Pittsburgh and Washington, Pa., plate prices include annealing and pickling.)

304.....	19.48	20.56		
410.....	17.31	18.39		
430.....	17.85	18.94		
446.....	19.48	20.56		

* With 2-3% molybdenum. † With titanium. ‡ With columbium. ** Plus machining agent †† High carbon. ‡‡ Free machining.

Metallurgical Coke

Price Per Net Ton	
Beehive Ovens	
Connellsville, furnace	*\$8.75
Connellsville, foundry	8.50-8.75
New River, foundry	9.00-9.25
Wise county, foundry	7.75-8.25
Wise county, furnace	7.25-7.75

By-Product Foundry	
Kearney, N. J., ovens	14.40
Chicago, outside delivered	14.35
Chicago, delivered	15.10
Terre Haute, delivered	14.85
Milwaukee, ovens	15.10
New England, delivered	15.10
St. Louis, delivered	12.25
Birmingham, delivered	14.85
Indianapolis, delivered	14.60
Cincinnati, delivered	14.55
Cleveland, delivered	14.75
Buffalo delivered	15.10
Detroit, delivered	14.61
Philadelphia, delivered	14.61

*Operators of hand-drawn ovens using trucked coal may charge \$9.35; retroactive to May 17, 1946.
†15.68 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal, freight allowed east of Omaha	15.00
Pure and 90% benzol	22.00
Toluol, two degree	22.00
Industrial Xylo	22.00
Per pound fob works	
Phenol (car lots, returnable drums)	11.25
Do., less than carlots	12.00
Do., tank cars	10.25
Eastern plants, per pound	
Naphthalene flakes, balls, bbl, to jobbers, "household use"	9.00
Per ton, bulk, fob plants	
Sulphate of ammonia	\$30.00

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras. Quotations based on mill prices announced March 1, 1946

	Hot-rolled bars	Structural shapes	Plates	Floor plates	Hot-rolled sheets (10-gage base)	Hot-rolled strip (14-in. and lighter 6-in. and narrower)	Hot-rolled strip (12-gage and heavier wider than 6-in.)	Galvanized flat sheets (24-gage base)	Cold-rolled sheets (17-gage base)	Cold-finished bars	Cold-rolled strip
Boston	4.356 ¹	4.203 ¹	4.203 ¹	6.039 ¹	4.050 ¹	5.548 ¹	4.418 ¹	5.725 ¹⁴	5.031 ¹⁴	4.656 ²¹	4.965
New York	4.184 ¹	4.038 ¹	4.049 ¹	5.875 ¹	3.856 ¹	4.375 ¹	4.275 ¹	5.501 ¹²	4.838 ¹⁴	4.584 ²¹	5.075
Jersey City	4.155 ¹	4.018 ¹	4.049 ¹	5.875 ¹	3.856 ¹	4.375 ¹	4.275 ¹	5.501 ¹²	4.890 ¹⁴	4.605 ²¹	5.075
Philadelphia	4.114 ¹	3.937 ¹	3.875 ¹	5.564 ¹	3.774 ¹	4.664 ¹	4.554 ¹	5.499 ¹²	5.189 ¹⁴	4.564 ²¹	5.064
Baltimore	4.093 ¹	4.05 ¹	3.865 ¹	5.543 ¹	3.64 ¹	4.293 ¹	4.193 ¹	5.365 ¹¹	5.118 ¹⁴	4.543 ²¹	.....
Washington	4.232 ¹	4.22 ¹	4.067 ¹	5.632 ¹	3.842 ¹	4.432 ¹	4.332 ¹	5.667 ¹¹	5.007 ¹⁴	4.532 ²¹	.....
Norfolk, Va.	4.377 ¹	4.303 ¹	4.262 ¹	5.777 ¹	4.037 ¹	4.927 ¹	4.477 ¹	5.862 ¹¹	4.552 ¹⁴	4.677 ²¹	.....
Bethlehem, Pa.*	.....	3.70 ¹	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	3.70 ¹	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	3.70 ¹	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.60 ¹	3.65 ¹	3.92 ¹	5.55 ¹	3.575 ¹	4.21 ¹	4.11 ¹	5.20 ¹⁵	4.625 ¹⁶	4.20 ²¹	4.96
Buffalo (country)	3.50 ¹	3.55 ¹	3.55 ¹	5.15 ¹	3.475 ¹	3.85 ¹	3.750 ¹	5.10 ¹⁵	4.525 ¹⁶	4.10 ²¹	4.60
Pittsburgh (city)	3.60 ¹	3.65 ¹	3.65 ¹	5.25 ¹	3.575 ¹	3.35 ¹	3.850 ¹	5.327 ¹²	4.925 ¹⁴	4.20 ²¹	4.70
Pittsburgh (country)	3.50 ¹	3.55 ¹	3.55 ¹	5.15 ¹	3.475 ¹	3.85 ¹	3.750 ¹	5.10 ¹⁵	4.525 ¹⁶	4.10 ²¹	4.60
Cleveland (city)	3.60 ¹	3.88 ¹	3.85 ¹	5.48 ¹	3.575 ¹	3.95 ¹	3.850 ¹	5.347 ¹²	4.625 ¹⁴	4.20 ²¹	4.70
Cleveland (country)	3.50 ¹	.....	3.55 ¹	.....	3.475 ¹	3.85 ¹	3.750 ¹	.....	4.525 ¹⁶	4.10 ²¹	4.60
Detroit	3.70 ¹	3.952 ¹	3.90 ¹	5.572 ¹	3.675 ¹	4.050 ¹	3.950 ¹	5.491 ¹³	4.725 ¹⁴	4.25 ²¹	4.95
Omaha (city, del.)	4.32 ¹	4.37 ¹	4.37 ¹	5.97 ¹	4.045 ¹	4.52 ¹	4.42 ¹	6.00 ¹⁵	5.72 ¹⁴	4.945 ²¹	.....
Omaha (country)	4.22 ¹	4.27 ¹	4.27 ¹	5.87 ¹	3.945 ¹	4.42 ¹	4.32 ¹	5.90 ¹⁵	.....	.....	.....
Cincinnati	3.902 ¹	3.983 ¹	3.952 ¹	5.583 ¹	3.871 ¹	4.046 ¹	3.946 ¹	5.296 ¹³	4.271 ¹⁴	4.602 ²¹	.....
Youngstown	.....	.....	.....	.....	.....	.....	.....	4.85 ¹³	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.475 ¹	3.35 ¹	3.750 ¹	5.10 ¹⁵	.....	.....	.....
Chicago (city)	3.75 ¹	3.80 ¹	3.80 ¹	5.40 ¹	3.475 ¹	3.95 ¹	3.850 ¹	5.540 ¹⁵	4.425 ¹⁴	4.20 ²¹	4.90
Milwaukee	3.908 ¹	3.958 ¹	3.958 ¹	5.558 ¹	3.633 ¹	4.108 ¹	4.008 ¹	5.558 ¹³	4.583 ¹⁴	4.358 ²¹	5.058
Indianapolis	3.83 ¹	3.88 ¹	3.88 ¹	5.48 ¹	3.743 ¹	4.118 ¹	4.018 ¹	5.368 ¹²	4.793 ¹⁴	4.43 ²¹	5.030
St. Paul	4.092 ²	4.142 ²	4.142 ²	5.742 ²	3.817 ²	4.292 ²	4.192 ²	5.666 ¹²	4.767 ¹⁴	4.852 ²¹	5.395
St. Louis	3.918 ¹	3.968 ¹	3.968 ¹	5.568 ¹	3.643 ¹	4.118 ¹	4.018 ¹	5.622 ¹²	4.593 ¹⁴	4.522 ²¹	5.223
Memphis, Tenn.	4.296 ¹	4.346 ¹	4.346 ¹	6.071 ¹	4.221 ¹	4.596 ¹	4.496 ¹	5.746 ¹³	.....	4.821 ²¹	.....
Birmingham	3.75 ¹	3.80 ¹	3.80 ¹	6.153 ¹	3.675 ¹	4.05 ¹	4.05 ¹	5.20 ¹⁵	5.077 ¹⁴	4.39 ²¹	5.465
New Orleans (city)	4.353 ¹	4.408 ¹	4.408 ¹	6.323 ¹	4.283 ¹	4.65 ¹	4.55 ¹	5.808 ¹³	5.304 ¹⁴	5.078 ²¹	.....
Houston, Tex.	4.00 ¹	4.50 ¹	4.50 ¹	5.75 ¹	3.988 ¹	4.668 ¹	4.563 ¹	5.763 ¹³	5.819 ¹⁴	4.10 ²¹	.....
Los Angeles	4.65 ¹	4.90 ¹	5.20 ¹	7.45 ¹	5.225 ¹	5.30 ¹	5.200 ¹	6.55 ¹³	7.425 ¹⁴	6.033 ²¹	5.863
San Francisco	4.20 ¹	4.15 ¹	4.15 ¹	5.35 ¹	4.125 ¹	4.50 ¹	4.50 ¹	6.35 ¹³	6.375 ¹⁴	5.733 ²¹	7.583
Portland, Ore.	4.70 ²	4.70 ²	5.00 ²	6.75 ²	4.875 ²	6.85 ²	5.000 ²	6.20 ¹⁵	6.825 ¹⁴	5.933 ²¹	.....
Tacoma, Wash.	4.60 ²	4.70 ²	5.00 ²	6.75 ²	4.87 ²	5.80 ²	4.60 ²	6.40 ¹⁵	6.55 ¹⁴	6.23 ²¹	.....
Seattle	4.60 ²	4.70 ²	5.00 ²	6.75 ²	4.87 ²	5.80 ²	4.60 ²	6.40 ¹⁵	6.55 ¹⁴	6.23 ²¹	.....

*Basing point cities with quotations representing mill prices, plus warehouse spread; †open market price.

BASE QUANTITIES

¹—400 to 1999 pounds; ²—400 to 14,999 pounds; ³—any quantity; ⁴—300 to 1999 pounds; ⁵—400 to 3999 pounds; ⁶—300 to 9999 pounds; ⁷—400 to 39,999 pounds; ⁸—under 2000 pounds; ⁹—under 4000 pounds; ¹⁰—500 to 1499 pounds; ¹¹—one bundle to 39,999 pounds; ¹²—150 to 2249 pounds; ¹³—150 to 1499 pounds; ¹⁴—three to 24 bundles; ¹⁵—450

to 1499 pounds; ¹⁶—one bundle to 1499 pounds; ¹⁷—one to nine bundles; ¹⁸—one to six bundles; ¹⁹—100 to 749 pounds; ²⁰—300 to 1999 pounds; ²¹—1500 to 39,999 pounds; ²²—1500 to 1999 pounds; ²³—1000 to 39,999 pounds; ²⁴—400 to 1499 pounds; ²⁵—1000 to 1999 pounds; ²⁶—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; ²⁷—300 to 4999 pounds.

ORES

Lake Superior Iron Ore
Gross ton, 51 1/2% (Natural)
Lower Lake Ports

Old range bessemer \$5.45
Mesabi nonbessemer 5.05
High phosphorus 5.05
Mesabi bessemer 5.20
Old range nonbessemer 5.30

Eastern Local Ore
Cents, units, del. E. Pa.
Foundry and basic 56-
63% contract 18.00

Foreign Ore
Cents per unit, cif Atlantic ports

Manganiferous ore, 45-
55% Fe., 6-10% Mn. Nom.
N. African low phos. Nom.
Swedish basic, 60 to 68%
Spanish, N. African ba-
sic, 50 to 60% Nom.
Brazil iron ore, 68-69%
fob Rio de Janeiro 7.50-8.00

Tungsten Ore
Chinese Wolframite, per
short ton unit, duty
paid \$24.00

Chrome Ore
Gross ton fob cars, New York, Phila-
delphia, Baltimore, Charleston,
S. C., Portland, Ore., or Tacoma,
Wash.

(S S paying for discharge; dry
basis, subject to penalties if guar-
antees are not met.)

Indian and African

48% 2.8:1 \$39.75
48% 3:1 41.00
48% no ratio 31.00

South African (Transvaal)

44% no ratio \$27.40
45% no ratio 28.30
48% no ratio 31.00
50% no ratio 32.80

Brazilian—nominal

44% 2.5:1 lump \$33.65
48% 3:1 lump 43.50

Rhodesian

45% no ratio \$28.30
48% no ratio 31.00
48% 3:1 lump 41.00

Domestic (seller's nearest rail)

48% 3:1 \$43.50
less \$7 freight allowance.

Manganese Ore

Sales prices of Office of Metals Re-
serve, cents per gross ton unit, dry,
48%, at New York, Philadelphia,
Baltimore, Norfolk, Mobile and New
Orleans, 85c; Fontana, Calif., Provo,

Utah, and Pueblo, Colo., 91c; prices
include duty on imported ore and
are subject to established premiums,
penalties and other provisions. Price
at basing points which are also
points of discharge of imported man-
ganese ore is fob cars, shipside, at
dock most favorable to the buyer.
Outside shipments direct to con-
sumers at 15c to 17c per unit less
than Metal Reserve prices.

Molybdenum

Sulphide conc., lb., Mo. cont.,
mines \$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

Chemical Composition Limits, Per Cent										Basic open-hearth Electric furnaces			
	Designation	Carbon	Mn	Si	Cr	Ni	Mo	Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per GT		
Chinese Tungsten Ore	NE 9415	.18-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	\$0.812	\$16.230	\$1.353	\$27.050		
Chinese Wolframite, per short ton unit, duty paid	NE 9425	.28-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.812	18.230	1.353	27.050		
	NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.866	17.312	1.407	28.132		
	NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.703	14.066	1.244	24.886		
	NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.298	25.968	1.677	33.542		
	NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.298	25.968	1.677	33.542		

Extras are in addition to a base price of 2.921c, per pound on finished products and \$58.43 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Maximum prices per gross ton fixed by OPA schedule No. 10, last amended July 27, 1946; \$2 increase may be charged on adjustable pricing contracts made between May 29 and July 27. Delivered prices do not include 3 per cent federal tax, effective Dec. 1, 1942.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	\$29.50	\$29.00	\$30.50	\$30.00
Newark, N. J., del.	31.20	30.70	32.20	31.70
Brooklyn, N. Y., del.	32.28			32.78
Birdsboro, Pa., base	29.50	29.00	30.50	30.00
Birmingham, base	24.38	23.50	29.50	
Baltimore, del.	30.22			
Boston, del.	29.68			
Chicago, del.	28.72			
Cincinnati, del.	28.94	28.06		
Cleveland, del.	28.62	27.74		
Newark, N. J.	30.82			
Philadelphia, del.	30.05	29.55		
St. Louis, del.	28.62	29.54		
Buffalo, base	28.50	27.50	29.50	29.00
Boston, del.	30.06	29.56	31.06	30.56
Rochester, del.	30.03		31.03	30.53
Syracuse, del.	30.58		31.58	31.08
Chicago, base	28.50	28.00	29.00	28.50
Milwaukee, del.	29.73	29.23	30.23	29.73
Muskegon, Mich., del.	32.05			32.05
Cleveland, base	28.50	28.00	29.00	28.50
Akron, Canton, del.	30.04	29.54	30.54	30.04
Detroit, base	28.50	28.00	29.00	28.50
Saginaw, Mich., del.	30.81	30.31	31.31	30.81
Duluth, base	29.00	28.50	29.50	29.00
St. Paul, del.	31.13	30.63	31.63	31.13
Erie, Pa., base	28.50	28.00	29.50	29.00
Everett, Mass., base	29.50	29.00	30.00	30.00
Boston, del.	30.06	29.56	31.06	30.56
Granite City, Ill., base	28.50	28.00	29.00	28.50
St. Louis, del.	29.00	28.50	29.00	29.00
Hamilton, O., base	28.50	28.00	29.00	28.50
Cincinnati, del.	29.68	29.18	29.68	29.68
Neville Island, Pa., base	28.50	28.00	29.00	28.50
*Pittsburgh, del., N.&S. sides	29.27	28.77	29.77	29.27
Provo, Utah, base	26.50	26.00		
Sharpshoot, Pa., base	28.50	28.00	29.00	28.50
Sparks Point, base	29.50	29.00		
Baltimore, del.	30.60			
Steelton, Pa., base		29.00		
Swedeland, Pa., base	29.50	29.00	30.50	30.00
Philadelphia, del.	30.43	29.93		30.93
Toledo, O., base	28.50	28.00	29.00	28.50
Youngstown, O., base	28.50	28.00	29.00	28.50
Mansfield, O., del.	30.66	30.16	31.16	30.66

* To Neville Island base add: 61c for McKees Rocks, Pa.; 93c Lawrenceville, Homestead, McKeessport, Ambridge, Monaca, Aliquippa; 97c (water), Monongahela; \$1.24, Oakmont, Verona; \$1.38, Brackenridge.

Exceptions to above prices: Struthers Iron & Steel Co., Struthers, O., may charge 50 cents a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable pig iron, Republic Steel Corp. may quote \$2 a ton higher for foundry and basic pig iron on the Birmingham base.

High Silicon, Silvery

6.00-6.50 per cent (base) ... \$34.00
6.51-7.00 ... \$35.00 9.01-9.50 ... 40.00
7.01-7.50 ... 36.00 9.51-10.00 ... 41.00
7.51-8.00 ... 37.00 10.01-10.50 ... 42.00
8.01-8.50 ... 38.00 10.51-11.00 ... 43.00
8.51-9.00 ... 39.00 11.01-11.50 ... 44.00
Fob Jackson county, O., per gross ton; Buffalo base \$1.25 higher.
Buyer may use whichever base is more favorable.

Electric Furnace Ferro-silicon: Si 14.01 to 14.50%, \$50 Jackson co.; each additional 0.50% silicon up to and including 18% add \$1; low impurities not exceeding 0.005 P, 0.40 Si, 1.0% C, add \$1.

Bessemer Ferro-silicon

Prices same as for high silicon silvery iron, plus \$1 per gross ton.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn., \$33.00. (For higher silicon bases a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. \$28.00
Valley base 28.00

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo, N. Y., \$34.00 base; \$35.38, del., Philadelphia. Intermediate phosphorus, Central Furnace, Cleveland, \$31.00.

Differentials

Basing point prices are subject to following differentials:
Silicon: An additional charge not to exceed 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).
Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge not to exceed 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.
Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, \$2 a ton; for each additional 0.25% nickel, \$1 a ton.

Refractories

Per 1000, fob shipping point.
Net prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky. \$81.00

High Heat Duty

Pa., Ill., Md., Mo., Ky. 65.00
Ala., Ga. 65.00
N. J. 70.00

Intermediate Heat Duty

Ohio 57.00
Pa., Ill., Md., Mo., Ky. 59.00
Ala., Ga. 51.00
N. J. 62.00

Low Heat Duty

Pa., Md., Ohio 51.00

Malleable Bung Brick

All bases 75.00

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press 42.00
Wire Cut 40.00

Silica Brick

Pennsylvania 65.00
Joliet, E. Chicago 74.00
Birmingham, Ala. 65.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.
Bulk 22.00
Bags 26.00

Basic Brick

Net ton, fob Baltimore, Plymouth Meeting, Chester, Pa.
Chrome brick 54.00
Chem. bonded chrome 54.00
Magnesite brick 76.00
Chem. bonded magnesite 65.00

Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net ton, carloads, effective CaF₂ content, 70% or more, \$33; 65% to 70%, \$32; 60% to 65%, \$31; less than 60%, \$30.

Ferroalloy Prices

Spiegeleisen: 19-21% carbon per gross ton, Palmerton, Pa., \$36; Pittsburgh, \$40.50; Chicago, \$40.60.
Ferromanganese, standard: 78-82% C, gross ton duty paid, \$135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Rockdale or Rockwood, Tenn. (where Tennessee Products Co. is producer), Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); \$140 fob cars, Pittsburgh (where Carnegie-Illinois Steel Corp. is producer); add \$6 for packed c.l., \$10 for ton, \$13.50 for less ton; \$1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: Special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.55c; regular, 21.05c; medium, 15.75c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Ferromanganese Briquets: (Weight approx. 3 lb and containing exactly 2 lb Mn) per lb of briquets. Contract, carlots, bulk 0.0605c, packed 0.063c, tons 0.0655c, less 0.068c, eastern, freight allowed; 0.068c, 0.0655c, 0.078c, central; 0.068c, 0.0685c, 0.0855c and 0.088c, western; spot up 0.25c.

Ferrotungsten: Spot 10.00 lb or more, per lb contained W, \$1.90; contract, \$1.88; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained Ti; ton

lots \$1.23; less-ton lots \$1.25; eastern. Spot up 5c per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb contained Ti; ton lots \$1.35; less-ton lots \$1.40 eastern. Spot up 5c per lb.

Ferrotitanium, High-Carbon: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C \$142.50; 3-5% C \$157.50.

Ferrovandium: V 35-55%, contract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade \$2.70; special grade \$2.80; highly-special grade \$2.90.

Ferromolybdenum: 55-75% per lb. contained Mo, fob. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% P content with unitage of \$3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price \$58.50, spot \$62.25.

Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 12.65c, ton lots 13.10c, smaller lots 13.50c; 80-90% c.l. 10.35c, ton lots 10.85c, smaller lots 11.35c; 75% c.l. 9.40c, ton lots 9.95c, smaller lots 10.45c; 50% c.l. 7.90c, ton lots 8.50c, smaller lots 9.10c. Prices are fob shipping point, freight allowed, per lb. of contained Si. Spot prices 0.25c higher on 80-90%, 0.30c on 75%, 0.45c on 50%. Deduct 0.85c for bulk carlots.

Ferro-Boron: (B 17.50% min., Si 1.50% max., Al 0.50% max. and C 0.50% max.) per lb of alloy contract ton lots \$1.20, less ton lots \$1.30, eastern, freight allowed; \$1.2075 and \$1.3075 central; \$1.229 and \$1.329, western; spot add 5c.

Ferrocolumbium: 50-60% per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, \$2.25; less-ton lots \$2.30. Spot prices up 10 cents.

Ferrocromium: Contract, lump, packed; high carbon, eastern zone, c.l. 15.05c, ton lots 15.55c; central zone, add 0.40c and 0.65c; western zone, add 0.5c and 1.85c; high carbon, high nitrogen, add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c.

Low carbon, eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22c, 0.2% 21.50c, 0.5% 21c, 1% 20.50c, 2% 19.50c, add 1c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l., and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l., and 1.85c for 2000 lb to c.l.; carload packed differential 0.45c. Prices are per pound of contained Cr, fob shipping points. Low carbon, high nitrogen: Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

Ferrocromium, Special Foundry: (Cr 62-66%, C about 5-7%): Contract, lump, packed, eastern zone, freight allowed, c.l. 15.60c, ton lots 16.10c,

less than ton 16.75c; central zone, add 0.40c for c.l. and 0.65c for smaller lots; western zone, add 0.5c for c.l. and 1.85c for smaller lots. Deduct 0.55c for bulk carlots.

S. M. Ferrochrome, high carbon (Cr 60-65%, Si, Mn and C 4-6% each): Contract, lump, packed, eastern zone, freight allowed, c.l. 16.15c, ton lots 16.65c, less ton 17.30c; central zone, add 0.40c for c.l. and 0.65c for smaller lots; western zone, add 0.5c for c.l. and 1.85c for smaller lots. Prices are per lb of contained chromium; spot prices 0.25c higher. Deduct 0.55c for bulk carlots.

S. M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-8% and C 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium, 20.40c, 20.50c, 20.55c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up 0.25c.

Ferrocromium Briquets: Containing exactly 2 lb. Cr, packed, eastern zone, c.l. 9.50c, ton lots 9.80c, less than ton 10.10c, central zone, add 0.3c for c.l. and 0.5c for smaller lots; western zone, add 0.70c for c.l. and 2c for smaller lots. Deduct 0.30c for bulk carlots. Prices per lb. of briquets; spot prices 0.25c higher.

Chromium Metal: 97% min. chromium, max. 0.50% carbon, eastern zone, per lb contained chromium bulk, c.l. 79.50c, 2000 lb to c.l. 80c; central 81c and 82.50c; western 82.25c and 84.75c; fob shipping point, freight allowed.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Calcium metal: cast: Contract ton lots or more \$1.35, less, \$1.60, pound of metal; \$1.36 and \$1.61 central, \$1.40 and \$1.65, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up 0.25c.

Calcium-Silicon: (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb. of alloy. Contract, carlots, lump c.l., 12.90c, 2000 lb to c.l., 13.45c, central, 13.00c and 13.90c; western, 13.85c and 16.80c; min. 96% Si and max. 2% Fe, eastern, bulk; c.l., 12.50c, 2000 lb to c.l., 13.10c, central, 12.30c and 13.55c; western, 13.45c and 16.50c, fob shipping point, freight allowed. Price per lb contained Si.

Silicomanganese: containing exactly 2 lb. Mn and about 1/4 lb. Si, eastern zone, bulk, c.l. 5.80c, ton lots 6.35c; central zone, add 0.25c for c.l. and 1c for ton lots; western, add 0.55c for c.l. and 0.20c for ton lots. Ferrosilicon, weighing about 5 lb. and containing exactly 2 lb. Si, or about 2 1/4 lb. and containing exactly 1 lb. Si, packed, eastern zone, c.l. 3.90c, ton lots 4.15c, less ton lots 4.45c; central zone, add 0.15c for c.l. and 0.40c for smaller lots; western zone, add 0.30c for c.l. and 0.45c for smaller lots. Prices are fob shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.30c for bulk carlots.

Manganese-Fe: (Mn. 96% Mn, max. 2% Fe), per lb of metal, eastern zone, bulk, c.l. 30c, 2000 lb to c.l., 32c, central, 30.25c, and 33c; western, 30.55c and 35.05c.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1/4c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) per lb of alloy. Contract ton lots, \$1.89, less \$2.01, eastern; freight allowed; \$1.903 and \$2.023, central, \$1.935 and \$2.055 western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance), per lb of alloy. Contract, 5 tons or more, \$1.90, 1 ton to 5 tons, \$2.00, less than 1 ton \$2.10, eastern, freight allowed; \$1.9125, \$2.0125 and \$2.1125, central; \$1.9445, \$2.0445 and \$2.1445, western; spot same as contract.

Machine Turnings: (Delivered consumer's plant)
No. 1 Heavy Melt, Steel 18.75
No. 2 Heavy Melt, Steel 18.75
No. 2 Bundles 18.75
No. 3 Bundles 16.75
Mixed Borings, Turnings 13.75
Machine Shop Turnings 13.75
Billet, Forge Crops 23.75
Bar Crops, Plate Scrap 21.25
Cast Steel 21.25
Punchings 21.25
Elec. Furnace Bundles 19.75
Heavy Turnings 18.25

Cast Grades
(Fob Shipping Point)
Heavy Breakable Cast 16.50
Charging Box Cast 19.00
Cupola Cast 20.00
Unstripped Motor Blocks 17.50
Malleable 22.00
Chemical Borings 16.51

NEW YORK:
(Dealers' buying prices)
No. 1 Heavy Melt, Steel \$15.33
No. 2 Heavy Melt, Steel 15.33
No. 2 Hyd. Bundles 15.33
No. 3 Hyd. Bundles 13.33
Chemical Borings 14.33
Machine Turnings 10.33
Mixed Borings, Turnings 10.33
No. 1 Cupola 20.00
Charging Box 19.00
Heavy Breakable 16.50
Unstripped Motor Blocks 17.50
Stove Plate 19.00

BOSTON:
(Fob shipping points. Boston differential 99c higher, steelmaking grades; Providence, \$1.09 higher)
No. 1 Heavy Melt, Steel 14.06
No. 2 Heavy Melt, Steel 14.06
No. 1 Bundles 14.06
No. 2 Bundles 14.06
No. 1 Busheling 14.06
Machine Shop Turnings 9.06
Mixed Borings, Turnings 9.06
Short Shovel Turnings 13.31
Chemical Borings 16.53
Low Phos. Clippings 20.00
No. 1 Cast 20.00
Clean Auto Cast 20.00
Stove Plate 16.50
Heavy Breakable Cast 16.50

BUFFALO:
(Delivered consumers' plant)
No. 1 Heavy Melt, Steel \$19.25
No. 2 Heavy Melt, Steel 19.25
No. 1 Bundles 19.25
No. 2 Bundles 19.25

central zone, add 0.25c for c.l. and 1c for ton lots; western, add 0.55c for c.l. and 0.20c for ton lots. Ferrosilicon, weighing about 5 lb. and containing exactly 2 lb. Si, or about 2 1/4 lb. and containing exactly 1 lb. Si, packed, eastern zone, c.l. 3.90c, ton lots 4.15c, less ton lots 4.45c; central zone, add 0.15c for c.l. and 0.40c for smaller lots; western zone, add 0.30c for c.l. and 0.45c for smaller lots. Prices are fob shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.30c for bulk carlots.

Manganese-Fe: (Mn. 96% Mn, max. 2% Fe), per lb of metal, eastern zone, bulk, c.l. 30c, 2000 lb to c.l., 32c, central, 30.25c, and 33c; western, 30.55c and 35.05c.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1/4c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) per lb of alloy. Contract ton lots, \$1.89, less \$2.01, eastern; freight allowed; \$1.903 and \$2.023, central, \$1.935 and \$2.055 western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance), per lb of alloy. Contract, 5 tons or more, \$1.90, 1 ton to 5 tons, \$2.00, less than 1 ton \$2.10, eastern, freight allowed; \$1.9125, \$2.0125 and \$2.1125, central; \$1.9445, \$2.0445 and \$2.1445, western; spot same as contract.

No. 1 Busheling 19.25
Machine Turnings 14.25
Short Shovel Turnings 16.25
Mixed Borings, Turnings 14.25
Cast Iron Borings 15.25
No. 1 Cast 20.00
Low Phos. 21.75

PITTSBURGH:
(Delivered consumers' plant)
Railroad Heavy Melting \$21.00
No. 1 Heavy Melt, Steel 20.00
No. 2 Heavy Melt, Steel 20.00
No. 1 Comp. Bundles 20.00
No. 2 Comp. Bundles 20.00
Short Shovel Turnings 17.00
Mach. Shop Turnings 15.00
Mixed Borings, Turnings 15.00
No. 1 Cupola Cast 20.00
Heavy Breakable Cast 16.50
Cast Iron Borings 16.00
Billet, Bloom Crops 25.00
Sheet Bar Crops 22.50
Plate Scrap, Punchings 22.50
Railroad Specialties 24.50
Scrap Rail 21.50
Axles 26.00
Rail 3 ft. and under 23.50
Railroad Malleable 22.00
Shipping point.

CLEVELAND:
(Delivered consumer's plant)
No. 1 Heavy Melt, Steel \$19.50
No. 2 Heavy Melt, Steel 19.50
No. 1 Comp. Bundles 19.50
No. 2 Comp. Bundles 19.50
No. 1 Busheling 19.50
Mach. Shop Turnings 14.50
Short Shovel Turnings 16.50
Mixed Borings, Turnings 14.50
No. 1 Cupola Cast 20.00
Heavy Breakable Cast 16.50
Cast Iron Borings 13.50-14.00
Billet, Bloom Crops 24.50
Sheet Bar Crops 22.00
Plate Scrap, Punchings 22.00
Elec. Furnace Bundles 20.50

VALLEY:
(Delivered consumer's plant)
No. 1 R.R. Heavy Melt, Steel \$21.00
No. 1 Heavy Melt, Steel 20.00
No. 1 Comp. Bundles 20.00
Short Shovel Turnings 17.00
Cast Iron Borings 16.00
Machine Shop Turnings 15.00
Low Phos. Plate 22.50

MANSFIELD:
(Delivered consumer's plant)
Machine Shop Turnings \$15.00
CINCINNATI:
(Delivered consumer's plant)
No. 1 Heavy Melt, Steel \$19.50

Borosi: 3 to 4% B, 40 to 45% Si, \$6.25 lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: B 1.5-1.9%, ton lots, 45c lb; less-ton lots, 50c lb.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%), per lb of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed, 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up 0.25c.

Silvaz Alloy: (Si 35-40%, Va 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%), per lb of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.80c and 62.90c, western; spot up 0.25c.

SMZ Alloy: (Si 60-55%, Mn 5-7%, Zr 5-7% and Fe approx. 20% (per lb of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c, central zone; 14.05c, 14.60c and 15.10c, western; spot up 0.25c.

CMSSZ Alloy 4: (Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75% and C 3.00-4.50%) Contract carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up 0.25c.

CMSSZ Alloy 5: (Cr 50-56%, Mn

4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%) per lb of alloy. Contract, carlots, bulk, 10.75c, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c, 12.50c and 13.00c, central; 13.25c and 13.75c, 14.50c and 15.00c, western; spot up 0.25c.

Zircronum Alloy: Zr 12-15%, per lb of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads, bulk, per gross ton \$102.50; packed \$107.50; ton lots \$108; less-ton lots \$112.50. Spot up \$5 per ton.

Zircronum Alloy: Zr 35-40%, eastern, contract basis, carloads in bulk or package, per lb of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot up 1/4c.

Alsiater: (Approx. 20% Al, 40% Si, 40% Fe) contract basis fob Niagara Falls, N. Y., lump per lb 5.83c; ton lots 6.38c; less 6.83c. Spot up 1/4c.

Stiminal: (Approx. 20% each Si, Mn, Al) Contract, freight not exceeding St. Louis rate allowed, per lb alloy; carlots 8c; ton lots 8.75c; less-ton lots 9.25c.

Tungsten Metal Powder: Spot, not less than 97%, \$2.50-\$2.60; freight allowed as far west as St. Louis.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 7, 45c; all fob Bridgeville, Pa., usual freight allowance.

Vanadium Pentoxide, technical grade: Fused, approx. 89-92% V₂O₅ and 5.84% Na₂O; or air dried, 83-89% V₂O₅ and 5.15% Na₂O, \$1.10 per lb contained V₂O₅, fob plant, freight allowed on quantities of 25 lb and over to St. Louis.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. Quotations are on gross tons.

PHILADELPHIA:
(Delivered consumer's plant)
No. 1 Heavy Melt, Steel 18.75
No. 2 Heavy Melt, Steel 18.75
No. 2 Bundles 18.75
No. 3 Bundles 16.75
Mixed Borings, Turnings 13.75
Machine Shop Turnings 13.75
Billet, Forge Crops 23.75
Bar Crops, Plate Scrap 21.25
Cast Steel 21.25
Punchings 21.25
Elec. Furnace Bundles 19.75
Heavy Turnings 18.25

NEW YORK:
(Dealers' buying prices)
No. 1 Heavy Melt, Steel \$15.33
No. 2 Heavy Melt, Steel 15.33
No. 2 Hyd. Bundles 15.33
No. 3 Hyd. Bundles 13.33
Chemical Borings 14.33
Machine Turnings 10.33
Mixed Borings, Turnings 10.33
No. 1 Cupola 20.00
Charging Box 19.00
Heavy Breakable 16.50
Unstripped Motor Blocks 17.50
Stove Plate 19.00

BOSTON:
(Fob shipping points. Boston differential 99c higher, steelmaking grades; Providence, \$1.09 higher)
No. 1 Heavy Melt, Steel 14.06
No. 2 Heavy Melt, Steel 14.06
No. 1 Bundles 14.06
No. 2 Bundles 14.06
No. 1 Busheling 14.06
Machine Shop Turnings 9.06
Mixed Borings, Turnings 9.06
Short Shovel Turnings 13.31
Chemical Borings 16.53
Low Phos. Clippings 20.00
No. 1 Cast 20.00
Clean Auto Cast 20.00
Stove Plate 16.50
Heavy Breakable Cast 16.50

BUFFALO:
(Delivered consumers' plant)
No. 1 Heavy Melt, Steel \$19.25
No. 2 Heavy Melt, Steel 19.25
No. 1 Bundles 19.25
No. 2 Bundles 19.25

No. 1 Busheling 19.25
Machine Turnings 14.25
Short Shovel Turnings 16.25
Mixed Borings, Turnings 14.25
Cast Iron Borings 15.25
No. 1 Cast 20.00
Low Phos. 21.75

PITTSBURGH:
(Delivered consumers' plant)
Railroad Heavy Melting \$21.00
No. 1 Heavy Melt, Steel 20.00
No. 2 Heavy Melt, Steel 20.00
No. 1 Comp. Bundles 20.00
No. 2 Comp. Bundles 20.00
Short Shovel Turnings 17.00
Mach. Shop Turnings 15.00
Mixed Borings, Turnings 15.00
No. 1 Cupola Cast 20.00
Heavy Breakable Cast 16.50
Cast Iron Borings 16.00
Billet, Bloom Crops 25.00
Sheet Bar Crops 22.50
Plate Scrap, Punchings 22.50
Railroad Specialties 24.50
Scrap Rail 21.50
Axles 26.00
Rail 3 ft. and under 23.50
Railroad Malleable 22.00
Shipping point.

CLEVELAND:
(Delivered consumer's plant)
No. 1 Heavy Melt, Steel \$19.50
No. 2 Heavy Melt, Steel 19.50
No. 1 Comp. Bundles 19.50
No. 2 Comp. Bundles 19.50
No. 1 Busheling 19.50
Mach. Shop Turnings 14.50
Short Shovel Turnings 16.50
Mixed Borings, Turnings 14.50
No. 1 Cupola Cast 20.00
Heavy Breakable Cast 16.50
Cast Iron Borings 13.50-14.00
Billet, Bloom Crops 24.50
Sheet Bar Crops 22.00
Plate Scrap, Punchings 22.00
Elec. Furnace Bundles 20.50

VALLEY:
(Delivered consumer's plant)
No. 1 R.R. Heavy Melt, Steel \$21.00
No. 1 Heavy Melt, Steel 20.00
No. 1 Comp. Bundles 20.00
Short Shovel Turnings 17.00
Cast Iron Borings 16.00
Machine Shop Turnings 15.00
Low Phos. Plate 22.50

MANSFIELD:
(Delivered consumer's plant)
Machine Shop Turnings \$15.00
CINCINNATI:
(Delivered consumer's plant)
No. 1 Heavy Melt, Steel \$19.50

No. 2 Heavy Melt, Steel 19.50
No. 1 Comp. Bundles 19.50
No. 2 Comp. Bundles 19.50
Machine Turnings 10.50-11.00
Shoveling Turnings 12.50-13.00
Cast Iron Borings 11.50-12.00
Mixed Borings, Turnings 10.50-11.00
No. 1 Cupola Cast 20.00
Breakable Cast 16.50
Flashings 21.00-22.00
Low Phosphorus 20.50-21.00
Scrap Rails 20.50-21.00
Stove Plate 18.50-19.00

DETROIT:
(Delivered consumer's plant)
Heavy Melting Steel \$17.32
No. 1 Busheling 17.32
Hydraulic Bundles 17.32
Flashings 17.32
Machine Turnings 12.32
Short Shovel, Turnings 14.32
Cast Iron Borings 13.32
Low Phos. Plate 19.82
No. 1 Cast 20.00
Heavy Breakable Cast 16.50

CHICAGO:
(Delivered consumer's plant; cast grades fob shipping point; railroad grades fob tracks)
No. 1 R.R. Heavy Melt, Steel \$19.75
No. 1 Heavy Melt, Steel 18.75
No. 2 Heavy Melt, Steel 18.75
No. 1 Ind. Bundles 18.75
No. 2 Dir. Bundles 18.75
Baled Mach. Shop Turn. 18.75
No. 3 Galv. Bundles 16.75
Machine Turnings 13.75
Mix. Borings, Sh. Turn. 13.75
Short Shovel Turnings 15.75
Cast Iron Borings 14.75
Scrap Rails 20.25
Cut Rails, 3 feet 22.25
Cut Rails, 18-inch 23.50
Revolving Rails 22.25
Angles, Splice Bars 22.25
Plate Scrap, Punchings 21.25
Railroad Specialties 22.75
No. 1 Cast 20.00
R.R. Malleable 22.00

ST. LOUIS:
(Delivered consumer's plant; cast grades fob shipping point)
Heavy Melting \$17.50
No. 1 Locomotive Tires 21.00
Misc. Rails 19.00
Railroad Springs 22.00
Bundled Sheets 17.50
Axle Turnings 17.00
Machine Turnings 10.50
Shoveling Turnings 12.50
Revolving Rails 21.00

Street Car Axles 24.50
Steel Rails, 3 ft. 21.50
Steel Angle Bars 21.00
Cast Iron Wheels 20.00
No. 1 Cupola Cast 20.00
Charging Box Cast 19.00
Railroad Malleable 22.00
Breakable Cast 16.50
Stove Plate 19.00
Grate Bars 15.25
Brake Shoes 15.25

BIRMINGHAM:
(Delivered consumer's plant)
Billet Forge Crops \$22.50
Structural, Plate Scrap 19.00
Scrap Rails Random 18.50
Revolving Rails 20.50
Angle Splice Bars 20.50
Solid Steel Axles 24.00
Cupola Cast 20.00
Stove Plate 19.00
Long Turnings 11.00
Cast Iron Borings 20.00
Iron Car Wheels 20.00

LOS ANGELES:
(Delivered consumer's plant)
No. 1 Heavy Melt, Steel \$14.00
No. 2 Heavy Melt, Steel 13.00
No. 1, 2 Dir. Bundles 16.50
Machine Turnings 5.50
Mixed Borings, Turnings 5.50
No. 1 Cast 20.00

SAN FRANCISCO:
(Delivered consumer's plant)
No. 1 Heavy Melt, Steel \$17.00
No. 2 Heavy Melt, Steel 17.00
No. 1 Busheling 37.00
No. 1, No. 2 Bundles 17.00
No. 3 Bundles 9.00
Machine Turnings 7.00
Billet, Forge Crops 15.50
Bar Crops, Plate 15.50
Cast Steel 15.50
Cut, Structural, Plate 1 ft and under 18.00
Alloy-free Turnings 7.00
Tin Can Bundles 14.50
No. 2 Steel Wheels 21.50
Iron, Steel Axles 24.00
No. 2 Cast Steel 20.50
Uncut Frogs, Switches 18.00
Scrap Rails 18.50
Locomotive Tires 20.50

SEATTLE:
(Delivered consumer's plant)
No. 1 Heavy Melt, Steel \$14.50
No. 2 Heavy Melt, Steel 14.50
Heavy Railroad Scrap 15.50
(Fob shipping point)
No. 1 Cupola Cast 20.00

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 14.37½¢, del. Conn.; less carlots 14.50¢, refinery. Dealers may add ¼¢ for 5000 lb to carload; 1c, 1000-4999 lb; 1½¢, 500-999 lb; 2c, 0-499 lb. Casting, 14.12½¢, refinery, 20,000 lb or more; 14.37½¢, less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 15.25¢; 88-10-2 (No. 215) 18.50¢; 80-10-10 (No. 305) 18.00¢; No. 1 yellow (No. 405) 12.25¢; carlot prices, including 25¢ per 100 lb freight allowance; add ¼¢ for less than 20 tons.

Zinc: Prime western 8.25¢, select 8.35¢, brass special 8.50¢, intermediate 8.75¢, E. St. Louis; high grade 9.25¢, del., carlots. For 20,000 lb to carlots add 0.15¢; 10,000-20,000 lb 0.25¢; 2000-10,000 lb 0.4¢; under 2000 lb 0.50¢.

Lead: Common 8.10¢, chemical 8.20¢, corroding, 8.20¢, E. St. Louis for carlots; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester, Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00¢ del., pigs 14.00¢ del.; metallurgical 94% min. 13.50¢ del. Base 10,000 lb and over; add ¼¢ 2000-9999 lb; 1c less through 1000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 12.75¢; No. 12 foundry alloy (No. 2 grade) 12.62½¢; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 14.37½¢; grade 2 (92-95½%) 13.25¢; grade 3 (90-92½%) 12.00¢; grade 4 (85-90%) 11.37½¢. Above prices for 30,000 lb or more; add ¼¢ 10,000-30,000 lb; ½¢ 5000-10,000 lb; ¾¢ 1000-5000 lb; 1¼¢ less than 1000 lb. Prices include freight at carload rate up to 75¢ per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lb) 20.50¢ per lb, carlots. 22.50¢ 100 lb to c.l. Extruded 12-in. sticks 27.50¢, carlots; 29.50¢ 100 lb to c.l.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½¢ 1000-2239, 2½¢ 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00¢; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 51.87½¢; Grade C, 99.65-99.79% incl. 51.62½¢; Grade D, 99.50-99.64% incl., 51.50¢; Grade E, 99-99.49% incl. 51.12½¢; Grade F, below 99% (for tin content), 51.00¢.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50¢; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 15.00¢. On producers' sales add ¼¢ for less than carload to 10,000 lb; ½¢ for 9999-224 lb; and 2c for 223 lb and less; on sales by dealers, distributors and jobbers add ½¢, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, fob refinery 35.00¢ lb; pig and shot produced from electrolytic cathodes 36.00¢; "F" nickel shot or ingot for additions to cast iron, 34.00¢.

Mercury: Open market, spot, New York, \$98-\$100 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00¢ lb.

Beryllium-Copper: 3.75-4.25% Be, \$14.75 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms \$1.25 lb, del.; anodes, balls, discs and all other special or patented shapes, \$1.30.

Cobalt: 97-99%, \$1.50 lb, for 550 lb (bbl.); \$1.52 lb for 100 lb (case); \$1.57 lb under 100 lb.

Gold: U. S. Treasury, \$35 per ounce.

Indium: 99.9%, \$2.25 per troy ounce.

Silver: Open market, N. Y. 90.12½¢ per ounce.

Platinum: \$81.50 per ounce.

Palladium: \$24 per troy ounce.

Iridium: \$125 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 14.37½¢, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 25.81¢; yellow brass 23.67¢; commercial bronze, 95% 26.14¢, 90% 25.81¢; red brass, 85% 24.98¢, 80% 24.66¢; best quality 24.38¢; phosphor bronze, grade A 4% or 5%, 43.45¢; Everdur, Durozone or equiv., hot rolled, 31.98¢; naval brass 28.53¢; manganese bronze 31.98¢; muntz metal 26.78¢; nickel silver 5% 32.38¢.

Rods: Copper, hot rolled 22.16¢, cold drawn 23.16¢; yellow brass 18.53¢; commercial bronze, 95% 25.83¢, 90% 25.50¢; red brass, 85% 24.67¢, 80% 24.35¢; best quality 24.07¢; phosphor bronze, grade A 4% or 5% 43.70¢; Everdur, Durozone or equiv. cold drawn, 29.82¢; naval brass 22.59¢; manganese bronze 25.93¢; muntz metal 22.34¢; nickel silver 5% 34.44¢.

Seamless Tubing: Copper 25.85¢; yellow brass 26.43¢; commercial bronze 90% 28.22¢; red brass 85% 27.64¢, 80% 27.52¢; best quality brass 26.79¢; phosphor bronze, grade A 5% 44.70¢.

Copper Wire: Bare, soft, fob eastern mills, carlots 19.89¢, less carlots 20.39¢; weatherproof, fob eastern mills carlot 22.07¢, less carlots 22.57¢; magnet, delivered, carlots, 23.30¢, 15,000 lb or more 23.55¢, less carlots 24.05¢.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lb or more del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70¢	25.20¢
8-10	12"-48"	23.20¢	25.70¢
11-12	26"-48"	24.20¢	27.00¢
13-14	26"-48"	25.20¢	28.50¢
15-16	26"-48"	26.40¢	30.40¢
17-18	26"-48"	27.90¢	32.90¢
19-20	24"-42"	29.80¢	35.30¢
21-22	24"-42"	31.70¢	37.20¢
23-24	3"-24"	25.60¢	29.20¢

Lead Products: Prices to jobbers; full sheets 11.25¢; cut sheets 11.50¢; pipe 9.90¢, New York, 10.00¢ Philadelphia, Baltimore, Rochester and Buffalo, 10.50¢ Chicago, Cleveland, Worcester and Boston.

Zinc Products: Sheet fob mill, 13.15¢, 36,000 lb and over deduct 7%. Ribbon and strip 12.25¢, 3000-lb lots deduct 1%, 6000 lb 2%, 9000 lb 3%, 18,000 lb 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00¢; 1-3 tons 12.00¢; 500-2000 lb 12.50¢; 100-500 lb 13.00¢; under 100 lb 14.00¢. Hull plate (over 12") add 1c to boiler plate prices.

PLATING MATERIALS

Chromic Acid: 99.75%, flake, del., carloads 16.25¢; 5 tons and over 16.75¢; 1-5 tons 17.25¢; 400 lb to 1 ton 17.75¢; under 400 lb 18.25¢.

Copper Anodes: In 500-lb lots, fob shipping point, freight allowed, cast oval over 15 in., 25.125¢; curved, 20.375¢; round-oval straight, 19.375¢; electro-deposited, 18.875¢.

Copper Carbonate: 52-54% metallic Cu, 250 lb barrels 20.50¢.

Copper Cyanide: 70-71% Cu, 100-lb kegs or bbls 34.00¢, fob, Niagara Falls.

Sodium Cyanide: 96%, 200-lb drums 15.00¢; 10,000-lb lots 13.00¢ fob Niagara Falls.

Nickel Anodes: 500-2999 lb lots; cast and rolled carbonized 47.00¢; rolled depolarized 48.00¢.

Nickel Chloride: 100-lb kegs or 275-lb bbls 18.00¢ lb, del.

Tin Anodes: 1000 lb and over 58.50¢ del.; 500-999 59.00¢; 200-499 59.50¢; 100-199 61.00¢.

Tin Crystals: 400 lb bbls 39.00¢ fob Grasselli, N. J.; 100-lb kegs 39.50¢.

Sodium Stannate: 100 or 300-lb drums 36.50¢, del.; ton lots 35.50¢.

Zinc Cyanide: 100-lb kegs or bbls 33.00¢ fob Niagara Falls.

Scrap Metals

Brass Mill Allowances: Prices for less than 15,000 lb fob shipping point. Add ¼¢ for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	12.00	12.00	11.250
Yellow brass	9.875	9.625	9.125
Commercial bronze			
95%	11.250	11.000	10.500
90%	11.125	10.875	10.375
Red brass			
85%	10.875	10.625	10.125
80%	10.875	10.625	10.125
Best quality (71-79%)	10.500	10.250	9.750
Muntz metal	9.250	9.000	8.500
Nickel silver, 5%	10.500	10.250	9.750
Phos. br., A, B, 5%	12.750	12.500	11.500
Naval brass	9.500	9.250	8.750
Manganese bronze	9.500	9.250	8.750

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are fob shipping point; add ¼¢ for shipment of 60,000 lb of one group and ¼¢ for 20,000 lb of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper and copper borings 11.50¢; No. 2 copper wire and mixed heavy copper, copper tuyeres 10.50¢.

(Group 2) Soft red brass and borings, aluminum bronze 10.75¢; copper-nickel solids and borings 11.00¢; lined car boxes, cocks and faucets 9.50¢; bell metal 17.25¢; babbitt-line brass bushings 14.75¢.

(Group 3) Admiralty condenser tubes, brass pipe 8.75¢; muntz metal condenser tubes 8.25¢; old rolled brass 8.25¢; manganese bronze solids; (lead 0%-0.40%) 8.00¢; (lead 0.41%-1%) 7.00¢; manganese bronze borings, 7.25¢.

Aluminum Scrap: Price fob point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb, 11, 14, etc., 3 to 3.50¢ lb. All other high grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50¢ lb. Other high-grade alloys 3.50¢, 4.00¢ lb. Mixed plant scrap, all solids, 2, 2.50¢ lb borings and turnings one cent less than segregated.

Lead Scrap: Prices fob point of shipment. For soft and hard lead, including cable lead, deduct 0.75¢ from basing point prices for refined metal.

Zinc Scrap: New clippings 7.25¢, old zinc 5.75¢, fob point of shipment, add ¼¢ for 10,000 lb or more. New die cast scrap 4.95¢, radiator grilles 4.95¢, add ¼¢ for 20,000 lb or more. Unsweated zinc dross, die cast slab 5.80¢, any quantity.

Nickel, Monel Scrap: Prices fob point of shipment; add ¼¢ for 2000 lb or more of nickel or cupro-nickel shipped at one time and 20,000 lb or more of monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ¼¢ copper 23.00¢; 90-98% nickel, 23.00¢ per lb nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00¢ per lb contained nickel, plus 8.00¢ per lb contained copper; less than 90% combined nickel and copper 26.00¢ for contained nickel only.

Monel: No. 1 castings, turnings 15.00¢; new clipping 20.00¢; solder sheet 18.00¢.

Sheets, Strip . . .

Mills seek to limit CC rated tonnage to regular customers but expect added tonnage burden

Sheet & Strip Prices, Page 138

New York — Sheet sellers are going to make every effort to restrict acceptance of CC preference tonnage to their regular customers and believe they have support in this policy in the wording of the regulations covering reinstatement and amplification of these ratings. Many believe, or at least are hopeful, that tonnage already scheduled for next quarter will absorb a substantial amount of the preference business that will come their way. Nevertheless they feel that they will wind up with a sizable additional burden, which will mean that customers, not engaged in housing and agricultural requirements, will receive less than now on schedule.

Scarcity in electrical sheets is as pronounced as ever, with demand heavy and with the additional facilities which had been counted on for early this fall not likely to get into operation, with possibly an exception or two, until late in first quarter.

Cincinnati — Sheet mills are operating near capacity although lack of scrap reserves in some cases may force a lower level. One interest has revised rolling schedules to expand output of electrical sheets. Despite heavy pressure for deliveries, and for greater tonnage allotments, mills are trying to hold fourth quarter schedules within such bounds that carryover into next year will not be abnormal.

Cleveland — Shipments of flat-rolled products to most customers have not increased as much as the rise in steel ingot production would indicate. This is attributed to a combination of several factors.

In the first place, the actual tonnage of steel available to sheet mills has not risen in direct proportion to the operating rate. While many large producing units have all or practically all of their furnaces lighted, some are operating only five turns a week. In some instances operations are hampered by lack of electrical equipment and in others by shortage of scrap.

Mills have been unable to ship promised tonnages to some customers because part of this output has been diverted to other users under CPA warehouse and veterans' housing directives. The export directive, effective Sept. 1, likely will divert additional tonnages. The carryover from second quarter was heavier than had been anticipated by many companies and has taken up a substantial portion of the current quarter's output.

Chicago — Soon after Sept. 1, sheet-makers expect to have a line on what priorities will do to their schedules in fourth quarter and will be in a position to advise customers as to how much tonnage will be allocated to them in this period. It is a foregone conclusion that many customers will find their quotas cut. Long range guessing is that carryovers at the end of the year will be substantial and that mills will be able to take on only relatively small fill-ins to close-up first quarter. No producer in this area

is accepting business for first quarter, although certain known directed tonnages will have a place in those schedules. Customers are pressing insistently to find out where they stand in order to plan for their own production.

Pittsburgh — Mill production schedules are constantly being juggled to meet certified tonnage obligations and directives. This has resulted in many customers having to be content with substantially less tonnage than formerly promised for this quarter, and no improvement is indicated in the confused delivery situation for fourth quarter with restoration of CC ratings. At present mills do not know where they stand in respect to how much steel will be needed to meet rated orders or directives through the rest of this year and therefore are at a loss in telling many customers when to expect tonnage already on mill books. About 40,000 tons of cold-rolled and hot-rolled pickled sheets and some galvanized are expected to be placed soon for 1947 delivery under MM ratings for construction of caskets for return of war dead. The estimated 185,000 tons of sheets that will be rolled from the 205,000 tons of sheet bars to be supplied four nonintegrated mills is not too imposing in comparison with overall output, but it does represent a sizable proportion of light gage sheets currently being produced.

Philadelphia — Some sheet sellers by virtue of having pared down their third quarter quotas sharply, believe their carryovers Oct. 1 will not be heavy. In other words, the sellers, while not having supplied their customers with anything near as much as requested, will at least not be greatly behind on current commitments at the beginning of fourth quarter. Some producers ascribe this probability to the fact that they did not set up their current quarter quotas until the last minute and had been able to make a fairly good estimate as to what their burden would be under Direction 12, which expires Sept. 30, to be succeeded by the revived and expanded CC rating system. Others, especially some who have not employed the quarterly quota system, will not be in as good position as far as actual arrearages are concerned and will make their adjustments later, possible their major adjustments in fourth quarter in an effort to clean their slates for the new year.

Meanwhile, sheet producers are waiting to see what develops with respect to rated tonnage for fourth quarter. The deadline for applications was scheduled for Aug. 15, although a number of consumers apparently were not able to get their applications in promptly, but mills have not been able to appraise the extent of this business.

Steel Bars . . .

Mills in dark on preference needs for fourth quarter and books are filled to end of year on most sizes

Bar Prices, Page 138

New York — Although deadline for applications for CC ratings for fourth quarter closed Aug. 15, carbon bar sellers assert that they have not yet received any CC orders and at present are

still much in the dark as to what they can expect in the way of priority tonnage in the closing three months of the year. Undoubtedly a substantial portion of the CC tonnage they will be called upon to supply will involve steel already scheduled for rolling. However, on the other hand, they will probably have to accept a certain amount of tonnage, which will be at the expense of non-preference bookings. Where this is the case the work supplanted will be pushed back into next year in most instances.

This will be particularly true in all sizes of hot-rolled carbon bars, both flats and rounds, as mills are sold out for 1946 on the basis of direct orders and quota obligations, to say nothing of arrearages on current commitments. In cold-drawn tonnage a little capacity is still available for December for some of the larger sized rounds. One large drawer, for instance, can still accept rounds 5/8-inch and larger for that position, although he is sold out completely on all sizes of flats.

On an average, with respect to bar sizes, it would appear that most producers of hot carbon material are behind about 60 days or so on current commitments, with some in even a worse position. Producers generally are far behind on small rounds and flats, although they are catching up on the large sizes.

The situation in large sizes has resulted in some speculation to the effect that they will be the first to reflect any softening in the delivery situation. Some consumers, it appears, already have fairly good stocks and if there were any indications of a general loosening up in steel supply, they might be tempted to cancel at least a certain portion of the unfilled orders they may have with mills. This, in turn, would eventually result in an easing in schedules on smaller sizes, as mills engaged in rolling larger bars took up some of the burden of the smaller mills.

However, in the opinion of some producers, consumer inventories of large bars for the most part are not heavy, for the reason that all along, at least until recently, relatively good delivery promises could be had on large sizes and that consumers therefore have been conservative in their purchases.

Boston — Rated tonnage for carbon bars, fourth quarter, centers heavily in smaller sizes, the range in which congestion is already greatest. Rescheduling will be forced on mills to greater degree than expected and the objective of most producers to get more steel to manufacturing consumers next quarter may encounter snags. Mills are confronted by heavy carryovers and are unwilling to consider firmly consumer estimates for next year. Despite the tightness in carbon stock, consumers up to now, have managed to hold production at fairly high levels, although some planned increases have not materialized.

Philadelphia — Hot carbon bar consumers report that while mills still are well behind on commitments, tonnage is coming in steadily increasing volume. As a result manufacturing consumers are able to increase operations to the highest level since January and in some scattered instances are able to establish a peak for the year. This is especially true of builders of agricultural implements, who have been favored in the current quarter under Direction 12.

Difficulty in placing additional ton-

nage, however, is perhaps greater than at any time this year, as the new year is now only a little more than four months away, with mill schedules jammed and producers have not yet opened books for 1947. Until recently at least some larger sizes of hot-rolled rounds and flats could be placed for late 1946 delivery but this now is out of the question. A little tonnage in large cold-drawn carbon sizes can still be placed, but not as much as recently. The only bar product in free supply over the remainder of the year is hot-rolled alloy. Some large producers are covered until well into fourth quarter but others can accept substantial tonnage for October and beyond and in some instances can schedule a little business for late September.

Cleveland — Lagging shipments of steel to finishing mills are keeping bar mill operations well below capacity and, therefore, is preventing producers from increasing deliveries to consumers. In addition, GI housing and warehouse directives are diverting a substantial tonnage from previously scheduled channels. Pressure on sellers now originates chiefly with producers of consumer goods whose operations are increasing and who are attempting to gain more favorable positions on rolling schedules. Generally they can not be accommodated and may have to accept still later delivery if fourth quarter directives involve large tonnages. Users of cold-finished bars appear to be receiving better shipments than those of hot-rolled.

Seattle — Rolling mills are refusing 1947 business and will not consider first quarter orders until late in the year. Rolling schedules are full for four months and much tonnage has been refused, although an effort is being made to serve regular customers. Production averages 90 per cent in spite of labor turnover and lack of skilled personnel. Demand for merchant bars is larger than prewar levels and reinforcing bar needs are larger than for merchant quality.

Steel Plates . . .

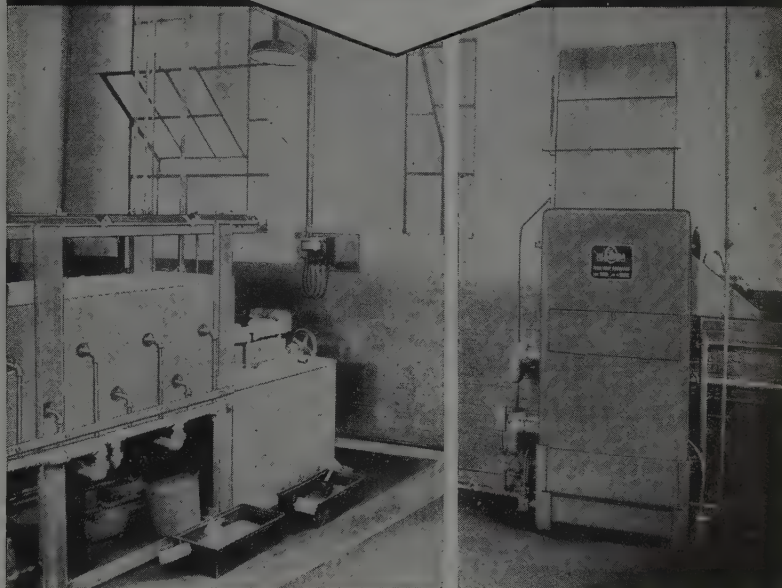
Production increasing but mills are sold for year and into next; demand for light gages heavy

Plate Prices, Page 139

New York — Although production at some eastern plate mills is still badly crippled by lack of pig iron and scrap, the general trend among platemakers for the past several weeks has been slightly upward, trade observers believe. During first half, plate production averaged around 288,000 to 290,000 tons per month. In June, however, the last month of the period, production was above average by almost 30,000 tons and in July, it is estimated, output got up to around 350,000 tons.

Meanwhile plate production should be stepped up at the Geneva, Utah, plant, beginning next month. Consequently, some producers expect to see plate production in last half exceed the output of around 1,730,000 tons in first half by at least 400,000 to 500,000 tons; and in the light of present pressure for plates this increase will be most welcome. As the situation stands

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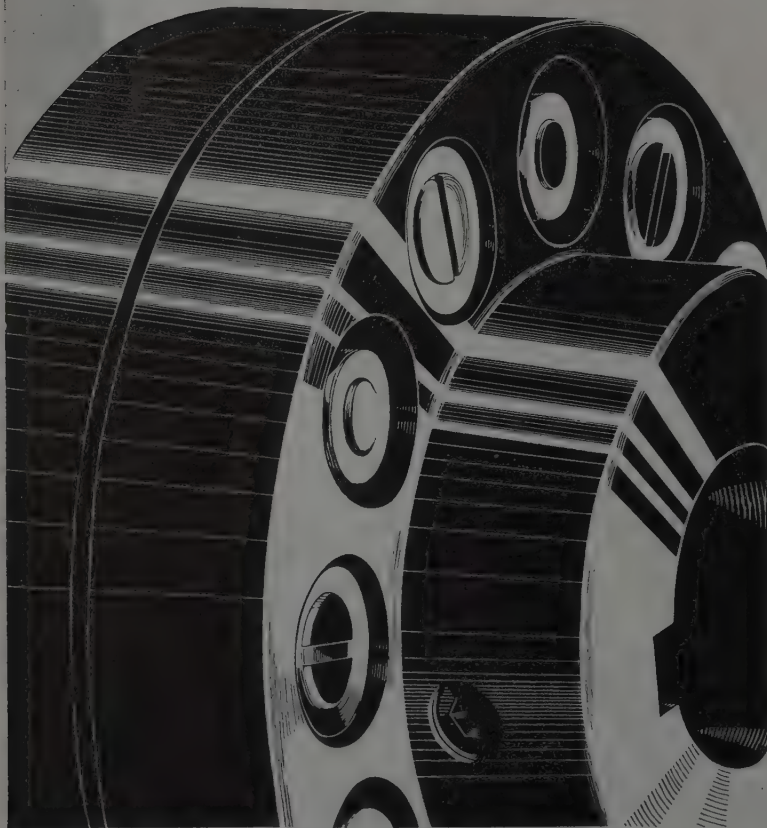


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now, plate producers are behind two to three months, and in one or two instances even more. Most eastern plate producers, in fact, regard themselves as being sold through most of first quarter of next year, if not sold through that period completely.

Boston — Demand for light welding-quality plates for small tanks shows no abatement and fabricators are hampered by inability to place additional tonnage; considerable volume is already overdue and inventories are light. This is reflected in heavy demands on warehouse for stock $\frac{1}{2}$ -inch and under. In heavier gages weldments take up substantial volume. Not only are straight carbon schedules filled into second quarter, but mills have also booked all orders carrying extras that they can handle through this year and beyond; floor plates are an exception, but for the most part producers are accepting fewer orders, notably mills shipping to this territory experiencing production handicaps.

Structural Shapes . . .

Inquiry slackens as delivery is deferred; fabricators working against heavy backlogs

Structural Shape Prices, Page 139

Pittsburgh — With mill deliveries far extended, volume of new structural inquiry continues well below indicated requirements. Fabricators report top-heavy backlogs but work on these projects is expected to show improvement as a result of heavier mill shipments in recent weeks. Leading producer here expects to increase production of structurals soon at its Geneva plant, which should ease the delivery situation somewhat for eastern consumers. A significant structural project recently approved by CPA involves \$607,100 for miscellaneous repairs at the Pittsburgh plant of Jones & Laughlin Steel Corp.

Chicago — Inquiry for structurals in this area has almost dried up. Fabricators already have booked all the tonnage they can handle with limited supply of steel and present manpower. No easing is in sight in mill allocations of plain shapes to fabricators, for it is a foregone conclusion that the balance of this year will see more lighter sections going to the railroad freight car program under a preferential program. Already smaller section are under heaviest pressure.

Philadelphia — Under pressure of various demands shape production shows improvement. During first half, due principally to strike interruptions, monthly production did not average much more than 230,000 tons. However, since then the trend has been appreciably upward, with possibility that this month may see an output of 350,000 tons. Unless restricted indefinitely by shortage of pig iron and scrap, production may reach 390,000 to 400,000 tons before the year is over, as there is a disposition to divert, if possible, more raw steel to shape production.

New York — Structural inquiry is substantially lighter, reflecting in part the government's latest restriction on non-housing construction. This is the 65-day moratorium on all government work, which has affected not only various federal projects, but state and civic work

where government aid has been promised. For instance, this has tied up considerable state bridge and road work on which fabricators in this district would otherwise be requested to bid.

However, no little amount of bridge and road work has been held up for some time because contractors did not care to figure jobs under the rigid terms insisted upon by public commissioners. For instance, escalator clauses have not been permitted in connection with much of this work, and contractors in many instances have hesitated, but refused to take a chance on quoting on a job wherein there was no provision for possible higher prices on material and labor once the work got under way.

Birmingham — Shapes are not in quite the persistent demand of a few months ago, largely because of scarcity of other building materials, which has resulted in delay of some projects. Considerable tonnage, however, would be taken subject to future developments were it available.

Seattle — Fabricating shops have ample backlogs and are refusing offered business because of scarcity of steel. Allocations are insufficient for current demand and deliveries are slow. Many small orders are offering but deliveries cannot be guaranteed. Pacific Car & Foundry Co., Seattle, has taken 200 tons for the Zellerbach paper mill at Camas, Wash.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 139

Pittsburgh — Sales of producers east of the Rockies increased further last month to about 75,000 net tons, due principally to ability of a large eastern producer to take on additional tonnage. July sales compared with 52,000 tons in June and 93,000 in like 1945 period. Most sellers are operating under substantially restricted production quotas and some are not accepting new orders. Shortage of rerolling rails prevent rollers from substantially increasing operations. More than \$37 million worth of highway construction in Pennsylvania, including most of the Penn Lincoln Parkway, may be held up by a freeze of federal funds, which action was taken both as an antiinflationary measure and because of uncertain price and supply situation on structural and reinforcing steel. Negotiations by Carnegie-Illinois Steel Corp. and other United States Steel Corp. subsidiaries for license to manufacture and sale of the Inland hi-bond reinforcing bar for concrete construction have been completed.

Boston — Reinforcing bar sellers are reluctant to commit ahead on larger tonnages and contractors meet increasing difficulty in filling requirements. Stocks are low, production light and outlook for tonnage over balance of this year is uncertain; this is notably the case in smaller sizes of billet steel bars. Inquiries frequently bring out no bids except on small lots and several thousand tons are awaiting placement. For the Maine Turnpike bridges and roads only one tender was received for 2735 tons, which Bethlehem Steel Co. will furnish through Bancroft-Martin Rolling Mill Co., Portland, Me.

Chicago — While inquiries for small lots of reinforcing steel are numerous, large projects have virtually disappeared. Lone exception to the latter is the South

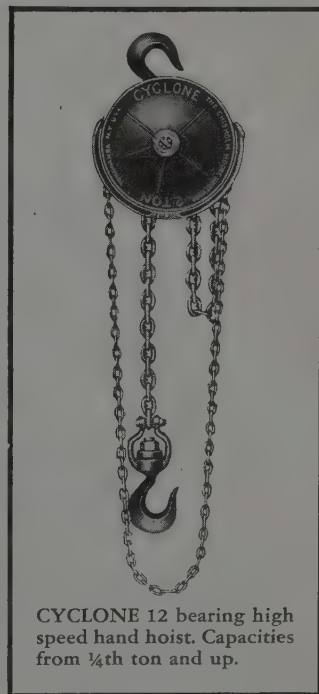
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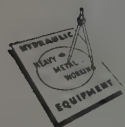
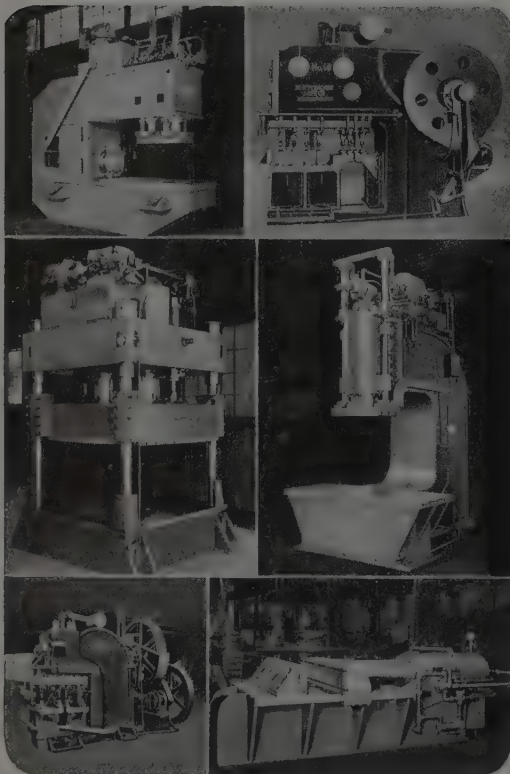
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Side intercepting sewer on which the Sanitary District of Chicago has advertised for bids Sept. 12. It is estimated that this job will require a total of 2750 tons of reinforcing distributed over a number of months. Few suppliers will find themselves in a position to bid. Already overcommitted, and not optimistic concerning the future, they pass up attractive business regularly.

Wire . . .

Wire Prices, Page 139

Chicago — Although output of wire and wire products is close to full capacity it fails to make a dent in the order backlog. Merchant products are particularly tight and jobbers claim they are not beginning to satisfy requirements of their customers. Chief among the short products are nails, barbed wire, fencing and bale ties.

Birmingham — Wire products probably are the most critically short in the district. The situation is especially true of nails which eases little, and to a somewhat less degree of wire fencing and drawn wire. Miscellaneous users of wire, especially for bed springs, press for supply but do not get even approximate requirements.

Tubular Goods . . .

Tubular Goods Prices, Page 139

Pittsburgh — Exceptionally heavy demand is expected to keep jobbers' inventories of steel pipe and oil country goods well below normal through remainder of this year. Limited production of tube rounds and skelp prevents full operations among nonintegrated pipe plants although some improvement in operations has been made recently. Most cast iron pipe producers have fallen well behind on delivery, due to pig iron shortage. Soil pipe producers are increasing operations as result of larger pig iron shipments under CPA certified tonnage.

Seattle — Cast iron pipe demand continues strong but sellers are handicapped by delayed delivery. Several large projects in this area are held back until shipments can be assured. At Pasco, Wash., Pacific States Cast Iron Pipe Co., Provo, Utah, was high on 200 tons, but received the contract because of more satisfactory delivery. The same firm was low at Wapato, Wash., for 475 tons, with award pending as alternate types are being considered.

Tin Plate . . .

Tin Plate Prices, Page 139

Pittsburgh — Continued shortage of freight cars, particularly box cars, has retarded tin plate shipments to a greater extent in recent weeks and unless remedied soon it is possible can manufacturers' production will be adversely affected for tin plate inventories are well below normal. Tin mill output currently is at the best level of year and production this quarter should exceed any previous quarter this year. However, interruptions to mill production during first half resulted in substantial carryovers of domestic tonnage which probably will not be made up through the remainder of this year. Fourth quarter export load of 136,000 tons is

believed unnecessarily large, and may have an important bearing on extent of expected revision in the present ratio of uncertified to certified tonnage shipped.

Pig Iron . . .

Shipments to foundries are small part of needs and melt reflects shortage of iron and scrap

Pig Iron Prices, Page 141

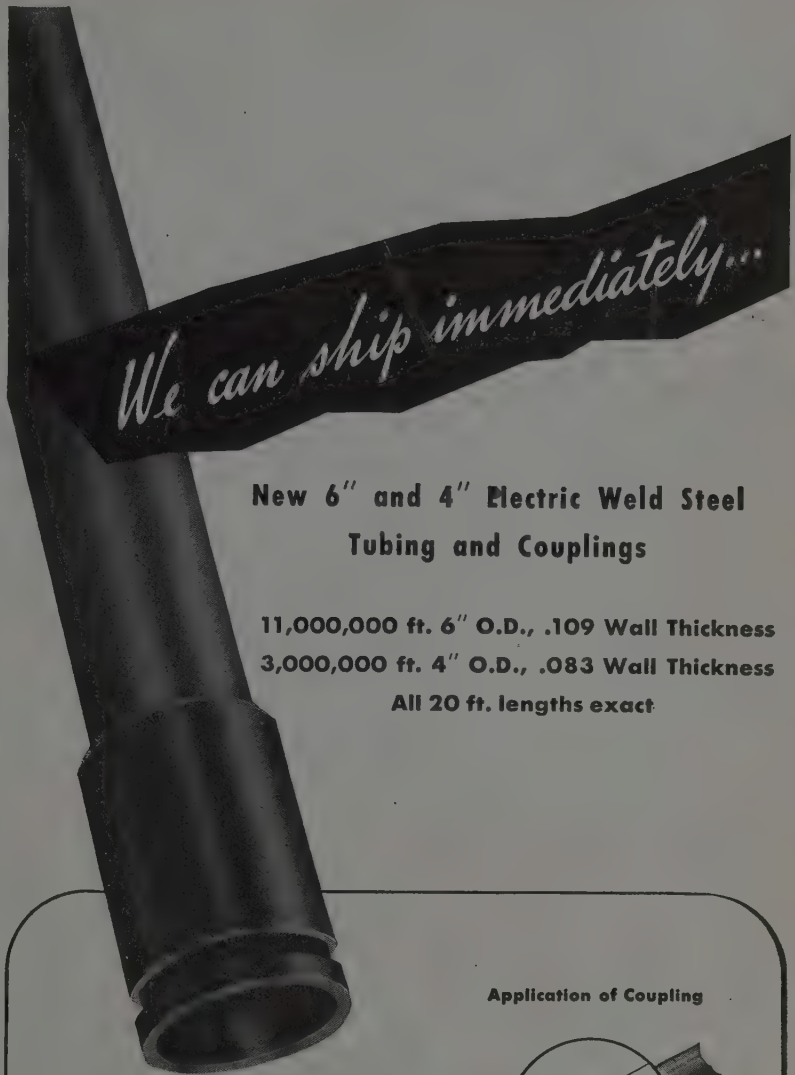
New York — While still too early to forecast with certainty, it appears that the foundry melt in his district in August will be down from the preceding month. Certainly that has been the trend so far, because of inability of various foundries to get not only pig iron but scrap in sufficient quantity. This decline has come despite the general suspension of foundry operations during the first week of July for vacations and inventory.

In general, pig iron production has increased, although in the case of the Troy, N. Y., furnace, which went into operation two or three weeks ago, it is still engaged in making low phosphorus iron, which does not help the local foundries. However, what gain there has been in foundry iron output, appears to have been offset by an increasing shortage of cast scrap.

Cleveland — Shipments of pig iron to foundries average only about 50 per cent of quotas since only a small tonnage used in this district is eligible for certification. With inventories at only about two weeks' needs, foundries are operating on a hand-to-mouth basis and plan to reduce operations by mid-September or early October unless pig iron deliveries improve. While a few castings producers have been able to draw on inventories accumulated during plant shut-downs earlier in the year, others are maintaining operations by switching to orders which carry least exacting specifications. In some instances, pig iron has been conserved by charging a larger amount of scrap obtained from customers and adding ferroalloys. Tightness is attributed in part to the fact that steel companies are using larger amounts of pig iron to counteract the shortage of scrap and to expansion in the foundry industry's capacity. One foundry in this district, for instance, is producing 50 per cent more castings than it did prewar and hopes to be able to produce 100 per cent more as soon as raw materials are available.

Chicago — Pig iron supply continues to limit output of foundries, and is expected to do so for some time. Allocations show no appreciable change over recent weeks and none appears likely. Foundries having work in housing and farm implements are getting what they need for these end uses under directives, but other lines suffer. Castings producers who are unable to benefit from priority regulations are obliged to balance their operations against iron receipts and press strenuously when shipments are delayed in transit. Most iron made in this district is going as hot metal into steel. With 37 of the district's 41 blast furnaces in operation, there are no prospects at the moment for increase in merchant production.

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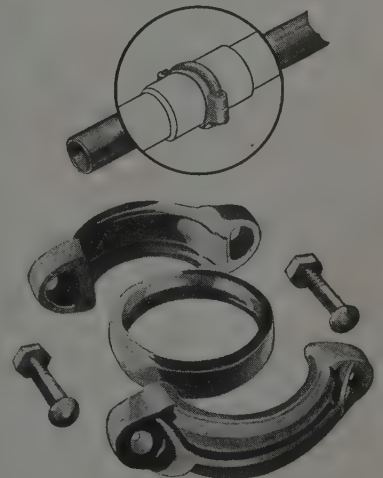
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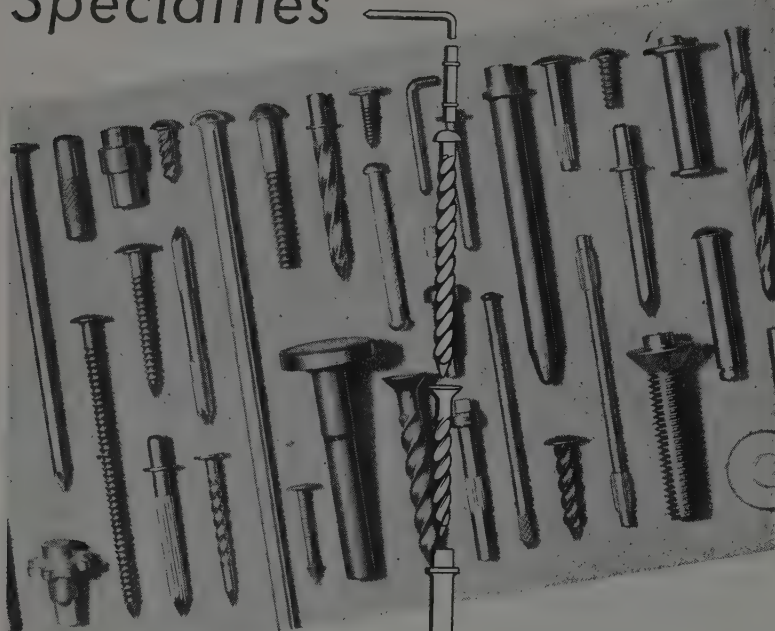
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regulations on pig iron directives brought a renewal of southern iron shipments, but neither these nor shipments of northern iron are in volume to allow capacity foundry operations. The supply is particularly precarious for some small melters. Shutdowns are being avoided, but in some cases continually threatening.

Boston — Pig iron supply is critical with an increasing number of foundries; a limited few with certifications are getting more, but at the expense of others. Melt is on the decline and operations more uneven. Consumers in some cases were too late with certification applications for August, but will probably get tonnage next month. As there is no additional iron in sight for this area, this will further pinch most melters. Most larger consumers are without ratings for iron and are desperately short. The lake shipping strike has not enhanced the prospects of the district furnace resuming production.

Philadelphia — At least temporary easing in basic iron is developing as a result of two district furnaces having recently changed from foundry to steel-making iron, one stack at Birdsboro, Pa., and the other at Swedeland, Pa. The latter switched over about Aug. 20 and is scheduled to keep up on basic until the end of this month. Late last week district furnaces had received no word as to what they will be called on to supply in the way of preference tonnage in September. Meanwhile, consumers not favored with preferences continue to appeal to Washington for relief. Foremost in their appeals are manufacturers of certain types of cookstoves and hardware not included among those whose production is regarded by Washington, apparently, as essential to the housing program.

Buffalo — CPA's directive program had little effect here as it conformed to a considerable degree with delivery schedules already adhered to by leading merchant iron producers. Foundries continue to plead for increased shipments as plans to increase melt are upset by lack of iron. Although five barges loaded with iron left here during the week for the seaboard, there is no appreciable change in eastern consignments under the CPA program. Sellers report the railroad car situation is still a problem. Only one of the area's 16 stacks is idle.

Pittsburgh — No action was taken in Washington last week to extend CPA's certified tonnage program past its expiration date Sept. 30. It is pointed out some decision on this plan soon must be reached as foundries must have their requests in for October iron certification by Sept. 15 for allocation to specific producers. Discussion continues on bringing into operation certain idle blast furnaces, but no decision yet has been reached as to extent of subsidies necessary in specific instances or how adequate supply of iron ore and coke can be made available. Certified tonnage for September had to be increased 25,000 tons to about 185,000 to handle late applications considered essential. This means that about 55 per cent of the merchant iron produced for foundries next month will be channeled to the relatively few companies coming within the scope of the CPA program. In this district, for example, 10 per cent of the customers will obtain around 50 per cent of the foundry pig iron production. One foundry in this district already has been forced to shut down due to lack of iron and

STEEL

many more will have to do likewise before Sept. 15.

Birmingham — Pig iron seems to grow somewhat tighter from week to week and merchant melters anticipate no worthwhile relief for several months. A considerable portion of local production is being channeled through certification, into essential uses, but foundries generally and miscellaneous users are hard pressed.

Seattle — Pig iron supply is tight and demand steady, the trade being unable to obtain wanted grades. Shipments are largely out of stock and foundries are forced to take what is offered. Scrap scarcity has increased demand for iron. The trade hopes Geneva Works will soon reach full production so that various analyses may be available. The recent price increase of \$2 makes the price at Provo \$26.50 for No. 2 foundry, which makes the Seattle delivered price about \$36.50.

Scrap . . .

Gravity of shortage increases as furnaces are shut down: hoarding for higher prices continues

Scrap Prices, Page 142

Pittsburgh — It is estimated that about 30 open hearths through the country are shut down because of scrap shortage and further curtailment in ingot operations is indicated as mills continue to draw heavily on dwindling inventory. Leading consumers have urged principal consumers to ship through normal channels all available scrap to alleviate the tight situation. Much of this tonnage is said to be bypassing brokers and dealers, going directly to mills on a reciprocal basis. Despite statements by OPA that higher prices are not being considered, considerable tonnage is still being held back in hope of upward revision. Steel producers oppose higher scrap prices on the basis they cannot afford additional production costs under present price ceilings. Although well below normal, movement of scrap to mills here is somewhat better than at Chicago, Youngstown and eastern areas. Carnegie-Illinois Steel Corp. has shipped 24,000 tons of scrap from Pittsburgh to Chicago to ease the shortage there. Scarcity of pig iron prevents further increases in its use to offset scrap shortage at foundries and steel mills.

Philadelphia — The scrap situation shows no improvement and, in fact, appears slightly worse. Manufactured scrap is in little better volume but yard scrap is moving even less freely than recently and relatively little government surplus material is being offered. The recently announced OPA regulation permitting no buyer to pay above ceiling prices for prepared scrap, in effect extending ceiling prices to dealers, is designed to give consumers a chance to get a greater portion and get it more quickly. However, just what recognition various Navy yards will give to this ruling remains to be seen, as all along, it is claimed, there has been a disposition to sell their scrap to highest bidders, regardless of dealer or consumer status.

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ers in obtaining adequate scrap supply is competition of other districts, especially Pittsburgh. Bartering continues to increase with much costly cross hauling involved. Upgrading is still widely in evidence and other steps are being taken in various instances to get around OPA price restrictions. Meanwhile no action has been taken on dealers' latest appeal for a price increase, which would be the first since April, 1941.

Boston — Movement of steelmaking scrap to consumers and dealers is light, the former with small inventories barely maintaining melt. Some scrap is being withheld, but the overall supply situation is tight and remote material is not coming out at current prices. Cast scrap supply is small, but some foundries have

slightly better inventories, built up during the OPA recess when premiums up to \$10 brought out considerable tonnage.

Buffalo — Mills are cutting deeper into shrinking reserve stocks and depending more on iron capacity. Railroad and industrial lists offer little relief because of the limited tonnage. Dealers report supply sources, in some instances, are holding material in anticipation of higher prices, but the aggregate amount is small. Dealers' yard stocks have reached a low point. Even if no overall increase in scrap ceilings is authorized, dealers expect to be compensated to some degree for additional processing costs. Leading mill consumers have suffered a drastic blow in the sharp falling off in water receipts of scrap. Receipts

to date this season are running about 25,000 tons, compared with approximately 85,000 tons in the same period a year ago. Mills were depending on water scrap to replenish stockpiles for the winter.

Chicago — Flow of scrap to mills has improved somewhat, but not to the point where receipts balance consumption. It is still necessary for steelmakers to dip into inventories, which is unhealthy considering that this is the season when inventories should be building up for winter. There is still disagreement over whether material is being withheld from market for possible higher prices. One large steelmaker has moved 24,000 tons of scrap from the Pittsburgh district in a three-week period, and while this is not large volume as far as scrap goes, it has provided considerable relief in maintaining near capacity operations.

Cincinnati — There is no improvement in scrap supply. Restoration of OPA failed to bring out tonnage held back in hope of higher prices. However, some material may still be hoarded, on speculation. One indication of the genuine shortage is slowing of tonnage from customary sources. Some mill and foundry scrap reserves are gone, and operations depend on current shipments.

Birmingham — Far from showing improvement, scrap becomes increasingly scarce. Some railroad scrap is moving and that is about all except for trading being done between scrap sources and soil pipe producers, now rather widespread in this district. The deal usually is 25 tons of pipe for about 100 tons of scrap. Such dealing with steel mills, however, is not reported here. Tennessee Coal, Iron & Railroad Co., because of the nature of its operations, is relatively well off for scrap and anticipates no interference with its production rate on that account.

Seattle — Steel scrap offerings are below current needs and mills are using from inventory. Shipments are below expected volume, attributed mainly to narrow profit margin for dealers under high labor costs. Shippers are holding back in some cases in hope of better prices. Shipyard surplus is practically exhausted but prewar sources would be ample if conditions were more attractive.

OPA Forbids Dealers To Pay Over Ceilings on Scrap

Office of Price Administration has broadened control of ceiling prices on prepared iron and steel scrap to lessen hoarding or violation of ceiling regulations. By Amendment No. 7 to Maximum Price Regulation No. 4 no person may buy or sell prepared iron or steel scrap at prices higher than the applicable ceiling. Previously such a regulation had applied only to consumers or their brokers, but sales to dealers were exempt. Sales of unprepared scrap do not come under this changed regulation.

The reason behind this change is that under pressure for material dealers are bidding over ceilings for prepared scrap, which they cannot sell at as high a price as their cost. Since this causes a loss to the dealer OPA believes either he will violate ceiling or will hold the scrap from the market in the hope of a higher ceiling. Should this amendment result

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in down grading prepared scrap to unprepared status further amendment is likely to be made.

OPA also ruled on mixed shipments, requiring physical segregation in the shipping vehicle and weighing each grade separately.

Rails, Cars . . .

Heavy buying by roads and government plan for new program reflects severe need

Track Material Prices, Page 139

New York — While the Office of Defense Transportation would like to see 42,000 domestic freight cars finished in the final five months of this year, so acute is the shortage in freight transportation facilities, it appears that this schedule cannot be fulfilled because of lack of steel.

Actually, it is said, the 171,930 tons of plates, shapes and bars required for finishing these cars have been placed, some long ago, for a number of cars were placed as early as last August; however, 76,000 tons of this amount, according to reliable information, have not as yet been scheduled, and it appears that the Civilian Production Administration is not inclined to give this tonnage special preference, as mills are badly jammed and housing and agricultural requirements are scheduled to continue to take priority.

To complete the 42,000-car schedule, as desired, the mills should roll, in round figures, 50,000 tons of plates, shapes and bars in August, 57,000 tons in September, 47,000 tons in October and 17,000 tons in November. Some mills believe they will be able to ship on schedule such orders for car steel as they have, but others, obviously, are not in such good position.

As of Aug. 1 there were 57,225 domestic freight cars on order in commercial car and railroad shops, all for delivery by the end of next May. Since then additional substantial orders have been placed, so that cars on order are now estimated to total around 65,000. Incidentally, of the 57,225 at the beginning of this month, 13,350 were on schedule in railroad company shops.

Deliveries during the first seven months of this year have been heavily retarded by shortage of materials and as recently as last month only 2500 units were completed during the period, all of which helps to account for the present shortage in freight cars. Light construction during the first seven months of this year can be ascribed in particular to the strikes in the steel and coal industries, which limited supply of steel. Shortage in lumber also was a factor, although recently this situation has eased, leaving steel as the real bottleneck. There is ample car capacity, but there is not the available steel.

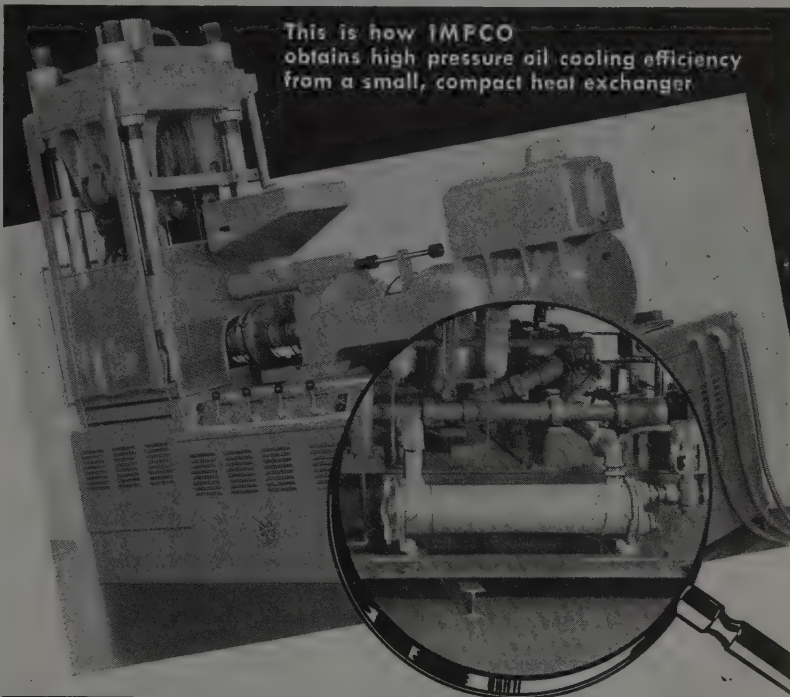
In spite of the heavy carryover of car orders likely at the end of this year, the Office of Defense Transportation is said to still be considering a government financed program of 50,000 freight cars for production in the first few months of next year. Since this proposal was first made there has been much more active buying by railroads, with a result that recently there was talk of the

program having been reduced by at least 10,000 cars, if it went ahead at all. However, the matter is still up in the air, with 50,000 the nominal figure and all of these to be box cars. It has been estimated that these 50,000 box cars would require approximately 900,000 tons of steel, including wheels and axles and miscellaneous castings, as well as plates, shapes, sheets and bars.

Domestic freight car buying in July was by far the heaviest for any month this year, involving 15,236 cars, which was only a few thousand short of equaling all the orders placed during first half of this year. In other words, and taking into account revisions in the monthly totals during first half, the July figure compared with 18,892 cars for

the first six months. It brought the total for the first seven months up to 34,128. Orders placed in July in railroad shops, involving 4150 cars, were the heaviest for any one month so far this year, exceeding 3110 cars awarded to railroad shops in March.

Awards so far this month have exceeded those for any full month this year, except July, and at present some substantial lists are pending, including among the more recent lists, 1500 box for the Gulf, Mobile & Ohio; 1000 miscellaneous for the Nashville, Chattanooga & St. Louis; and 1000 for the Southern Pacific. In view of the emphasis now being placed on box cars, it is interesting to note that the three above mentioned lists, include a total of 3000



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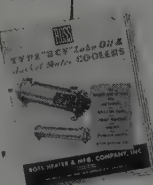
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box cars. Also there were a substantial number of box cars included in orders placed in the past few weeks, all of which lend support to the opinion, which still exists in many quarters, that if the government does decide to bring out a program, it will not be for as many as originally proposed and still apparently under tentative consideration.

In view of the pressure for freight cars for domestic operations, export car demand is being forced to take a back seat. Some work is going ahead on export cars, which had long been on order and for which some steel is on hand. For instance, the 36,000-car program for the French is expected to get off to a moderate start next month in the assembly of some cars. But, in general, foreign demand is attracting relatively little interest, notwithstanding certain new inquiry including 2950 small freight cars for Turkey, which is also in the market at present for 60 steam locomotives.

Following is a comparative table covering monthly awards of cars for domestic operation placed in both commercial and railroad shops. Monthly totals during first half of this year have been revised.

	1946	1945	1944	1943
Jan.	2,050	7,200	1,020	8,365
Feb.	2,403	1,750	18,240	350
March	4,516	2,500	6,510	1,935
April	3,764	1,120	4,519	1,000
May	3,025	1,526	1,952	870
June	3,334	670	1,150	50
July	15,236	3,500	795	4,190
Aug.		7,240	3,900	5,747
Sept.		12,840	400	6,820
Oct.		1,320	2,425	5,258
Nov.		1,650	1,065	870
Dec.		4,116	16,245	2,919
Total		45,432	53,221	41,955

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Iron Ore . . .

Iron Ore Prices, Page 140

Consumption of Lake Superior iron ore in July totaled 6,423,035 gross tons, compared with 4,994,936 tons in June and 6,532,273 tons in July, 1945, according to the Lake Superior Iron Ore Association, Cleveland. Cumulative consumption to Aug. 1 was 30,665,323 tons, compared with 46,878,576 tons in the comparable period last year.

Ore on hand at furnaces and on Lake Erie docks Aug. 1 totaled 30,428,615 tons, compared with 29,485,221 tons at the same date last year. Blast furnaces depending principally on Lake Superior ore in blast Aug. 1 numbered 167, compared with 156 a month earlier and 165 on Aug. 1, 1945. The steel strike in Canada caused all furnaces but one to be banked, a loss of five from July 1, or the total active would have been that much higher.

Refractories . . .

Refractories Prices, Page 141

Pittsburgh — Producers at St. Louis and east of the Mississippi recently raised refractory brick prices \$2 to \$5 to offset increased production costs resulting from higher coal prices, increased freight charges, and the advance in wages not compensated for by 11 per cent increase in refractory brick prices granted by OPA last spring. Super duty fire clay brick, high heat duty, and intermediate heat duty are now quoted at \$81, \$85,

and \$59 per 1000, respectively, fob shipping point in Pennsylvania.

Sellers state shortage of railroad cars is hampering shipments somewhat. Deliveries on standard items are available within 6 to 8 weeks, but special shapes are extended 4 to 6 months. Most producers are operating at capacity although the heavy demand makes it impossible to make much headway against order backlogs. Coke oven expansion programs will be a major factor in the demand situation through the remainder of this year, while many blast furnaces, open hearths and coke ovens are badly in need of relining. Prospect of bringing into operation, on a subsidy arrangement, some high cost blast furnaces to help meet pig iron requirements for housing and farm equipment programs, is seen adding to overall demand.

Warehouse . . .

Warehouse Prices, Page 140

Philadelphia — Warehouse business is slightly improved as tonnage from mills is being received more freely. Some jobbers expect August bookings to exceed those for July. Small bars, sheets and light shapes continue in outstanding demand.

Boston — Warehouse inventories of alloys and larger cold-drawn bars are generally well balanced, but distributors are still losing inventory in smaller sizes of carbon products, despite heavier mill deliveries. Shapes and plates approach lighter flat-rolled products in scarcity and fabricators, unable to get wanted deliveries from mills, are substantial buyers. Bars in small sizes are short with demand heavy. Relatively small ratio of heavier tonnage being taken in by warehouses goes into stock except slower moving items.

Cleveland — Shipments of steel to warehouses are spasmodic and likely will be sharply lower in fourth quarter. One distributor here, for instance, reported that an urgently needed tonnage that had been promised for early August delivery but had been postponed to a late August position has been postponed now to the first week in September at the earliest. The mill explained that while the steel operating rate based on the number of open hearths in operation has risen to a high level, actual production of steel has not improved proportionately. Due to heavy order backlogs coupled with necessity of making provision for certified and rated orders, most mills are not accepting any warehouse orders for fourth quarter. However, CPA may issue a mill directive calling for delivery of certain tonnages to warehouses. Third quarter directive called for tonnages equivalent to those of fourth quarter of last year. While July shipments showed marked improvement, they have fallen off this month, resulting in further drying up of inventories. Warehouse stocks are not more than 30 per cent normal and consist chiefly of heavy material. Stocks of flat-rolled products, structurals, strip, small angles and channels are depleted.

Metallurgical Coke . . .

Coke Prices, Page 139

Pittsburgh — OPA granted a price increase late last week to beehive oven coke operators, retroactive to May 17. The market is now quoted on the basis of \$8.75 per net ton, Connellsville, fur-

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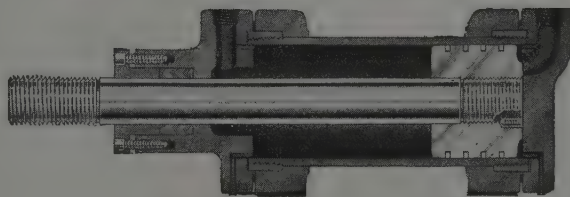
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nace, and \$9.35 for operators of hand-drawn ovens using trucked coal. Operators had been forced to raise wages about \$1.85 per day. In addition, the cost of coal is up 51 cents per ton, and it takes about 1.6 tons of coal to make one ton of coke.

Some independent operators banked their ovens early last week just prior to authorization of the price increase. No adverse effect to pig iron production as a consequence of these shutdown is expected, since production will be resumed at the higher price level. Major steel firms draw a reserve supply of coke from independent firms to supplement output of their own operations.

Shipments of Soil Pipe Resumed After Price Relief

A price increase of \$1.75 a ton has started soil pipe moving again out of the Birmingham district, major producing area.

Producers withheld shipments after the revived Office of Price Administration rolled soil pipe prices back to the June 30 level. Under Amendment 7 to Revised Price Schedule 100, OPA allowed a price increase of \$1.75 a ton, which industry spokesmen said "takes production out of the 'red' by a slim margin."

Fire Clay, Silica and Ladle Brick Prices Rise

Leading producers of refractories have advanced prices of fire clay brick, malleable bung brick, and silica brick an average of about \$4.16 per thousand while producers of ladle brick have advanced prices \$5.55 to \$5.85 per thousand.

Net prices, fob shipping point, are now as follows for brick produced in Pennsylvania, Missouri and Kentucky: Fire clay brick, super duty, \$81; high heat duty, \$65; intermediate duty, \$59. Malleable bung brick is quoted \$75, all bases; ladle brick, \$42 dry press and \$40 wire cut, Pennsylvania, Ohio, West Virginia, and Missouri; silica brick, \$65 Pennsylvania and Birmingham, Alabama; \$74 Joliet, Ill.

Magnesite and basic brick prices remain unchanged.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

4500 tons, 40 bridges, Maine Turnpike, Kittery-Portland, to American Bridge Co., Pittsburgh; Lane Construction Co. and Snodgrass Construction Co., general contractors; Howard, Tammen, Needles & Bergendorff, New York, engineers; Bethlehem Steel Co., Bethlehem, Pa., awarded 1200 tons steel sheet piling.

700 tons, plant, Carbide & Carbon Chemicals Co., Texas City, Tex., to Austin Bros., Dallas, Tex.

474 tons, bridge, Stratford, Iowa, for state, to Pittsburgh-Des Moines Steel Co., Pittsburgh; Ben Cole & Son, Ames, Iowa, contractor; bids April 30.

350 tons, sheet piling, extension to power station, Havana, Ill., for Illinois Power Co.,

to Bethlehem Steel Co., Bethlehem, Pa.

350 tons, sheet piling, extension to power station, Havana, Ill., for Illinois Power Co., to Carnegie-Illinois Steel Corp., Chicago.

250 tons, plant for Piasecki Helicopter Co., Lansdowne, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

224 tons, two 112-ton bridges, Ionia, Iowa, and Union Grove, Wis., for Chicago, Milwaukee, St. Paul & Pacific railroad, to American Bridge Co., Pittsburgh.

200 tons, Zellerbach paper plant, Camas, Wash., to Pacific Car & Foundry Co., Seattle.

170 tons, sheet piling, refinery expansion, Whiting, Ind., for Standard Oil Co. of Indiana, to Inland Steel Co., Chicago; Lummus Co., New York, contractor.

150 tons, two bridges at Toledo, O., for New York Central, to American Bridge Co., Pittsburgh.

150 tons, beam span, bridge R-209, Lawler, Iowa, for Chicago, Milwaukee, St. Paul & Pacific railroad, to American Bridge Co., Pittsburgh; bids March 25.

137 tons, bridge, Jefferson, Iowa, for state, to Pittsburgh-Des Moines Steel Co., Pittsburgh; Ben Cole & Sons, Ames, Iowa, contractor; bids April 30.

125 tons, beam spans and repairs in Iowa, for Chicago, Milwaukee, St. Paul & Pacific railroad, to American Bridge Co., Pittsburgh; bids May 21.

60 tons, steel grill decking for Montlake bridge, Seattle, to Irving Steel Co., New York.

STRUCTURAL STEEL PENDING

1900 tons, addition to Herald Tribune building, New York; bids asked; Lockwood Greene Engineers Inc., 10 Rockefeller Plaza, that city, in charge.

975 tons, underpass, Idlewild Municipal Airport, New York, bids Aug. 26.

670 tons, woolen mill, Dublin, Ga., for C. M. Guest & Sons.

325 tons, building, Orange, Tex., for E. I. duPont de Nemours & Son Inc.

300 tons, additions to duPont plant at Edgemoor, Del.

300 tons, pulp dryer building, Moorehead, Minn., for American Crystal Sugar Co.

300 tons, boiler house, Milwaukee, for Joseph Schlitz Brewing Co.; Kulgan Engineering Co., Philadelphia, engineer-contractor.

270 tons, bridge, Braymer, Wis., for Chicago, Milwaukee, St. Paul & Pacific railroad.

200 tons, alterations at Margaret-Orthodox station, Department of City Transit, Philadelphia; bids Aug. 31.

185 tons, two Washington state highway bridges; bids to Olympia Sept. 4.

149 tons, bridge, Sec. 1-F, McLean county, Ill., for state; Illinois Steel Bridge Co., Jacksonville, Ill., low on bids Aug. 9; bids rejected, new bids Aug. 27.

120 tons, bridge, Sec. 45-F, Pike county, Ill., for state; Illinois Steel Bridge Co., Jacksonville, Ill., low on bids Aug. 9; bids rejected, new bids Aug. 27.

116 tons, Cedar river bridge, Covington, Iowa, for Chicago, Milwaukee, St. Paul & Pacific railroad; bids June 5.

Unstated, plant for Willard Storage Battery Co., 150 x 360 feet, Portland, Oreg.; general contract to D. M. Drake, Portland.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2735 tons, bridges and highways, Maine Turnpike, Kittery-Portland, to Bancroft-Martin Rolling Mills Co., Portland, Bethlehem Steel Co., Bethlehem, Pa., to finish steel; Lane Construction Co. and Snodgrass Construction Co., general contractors; Howard, Tammen, Needles & Bergendorff, New York, engineers.

250 tons, radio material school, Great Lakes, Ill., for Great Lakes Naval Training Station, to Joseph T. Ryerson & Son Inc., Chicago; Henry Ericson Co., Chicago, contractor; bids June 25.

250 tons, gas storage container, East Chicago,

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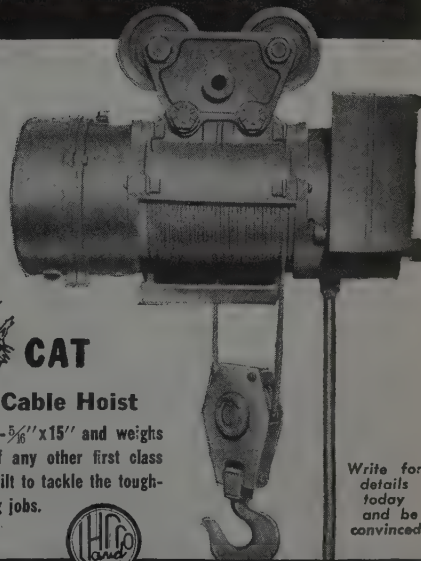
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Ind., for Northern Indiana Public Service Co., to Bartlett Hayward Division Koppers Co. Inc., Baltimore.

REINFORCING BARS PENDING

2750 tons, South Side intercepting sewer, Contract No. 2, Chicago, for Sanitary District of Chicago; bids Sept. 12.

110 tons, Washington state bridges; bids to Olympia, Sept. 4.

Unstated, concrete warehouse, 100 x 100 feet for Grays Harbor Port Commission, Aberdeen, Wash.; Lamb Construction Co. contractor.

PLATES . . .

PLATES PLACED

4000 tons, gas storage container, East Chicago, Ind., for Northern Indiana Public Service Co., to Bartlett Hayward Division Koppers Co. Inc., Baltimore.

PIPE . . .

CAST IRON PIPE PLACED

200 tons, various sizes, Pasco, Wash., to Pacific States Cast Iron Pipe Co., Provo, Utah.

CAST IRON PIPE PENDING

475 tons, various sizes for Wapato, Wash.; Pacific States Cast Iron Pipe Co., Provo, Utah, low.

RAILS, CARS . . .

RAILROAD CARS PLACED

Southern Railway, 140 streamlined coaches; 76 to Pullman-Standard Car Mfg. Co., Chicago; 41 to Budd Co., Philadelphia; 23 to American Car Foundry Co., New York;

Pullman-Standard award included 71 sleepers and five mail-baggage cars; and Budd award 26 coaches, nine diners and six lounge coaches; American Car award, 11 coaches, four baggage-dormitory cars, three lounge-bar cars, three mail-baggage cars and four diners. Of cars placed with American Car 18 will be of aluminum.

RAILROAD CARS PENDING

Baltimore & Ohio, 1000 fifty-ton box cars.

Gulf, Mobile & Ohio, 1500 box cars, pending.

Nashville, Chattanooga & St. Louis, 1000 freight cars, comprising 500 fifty-ton box cars, 300 fifty-ton hopper cars and 200 fifty-ton gondola cars, bids asked.

Seaboard Air Line, 150 seventy-ton hopper cars, bids asked.

Southern Pacific, 1000 fifty-ton steel sheathed box cars, bids asked; this is in addition to 4050 freight cars, placed by the railroad within the last year and a half.

Turkish Purchasing Commission, Washington, 2950 miscellaneous freight cars, including 1500 twenty-ton four-wheel box cars and 1000 twenty-ton four-wheel high side gondola cars, contemplated.

LOCOMOTIVES PLACED

Erie, 20 diesel-electric switch engines, including nine 1000-horsepower, six 660-horsepower and one 380-horsepower unit, placed with American Locomotive Co., New York, and two 1000-horsepower and two 660-horsepower units, placed with Baldwin Locomotive Works, Eddystone, Pa.

LOCOMOTIVES PENDING

Argentine State Railways, 5 to 50 steam locomotives, bids asked.

Turkish Purchasing Commission, Washington, 60 steam locomotives, comprising 40 of the 2-10-0 type and 20 of the 2-12-0 type, contemplated.

CONSTRUCTION AND ENTERPRISE

ALABAMA

MONTGOMERY, ALA.—Hazel-Atlas Glass Co., Wheeling, W. Va., will start construction soon of a glass container plant and box plant for manufacturing corrugated boxes for shipping.

CALIFORNIA

GLENDAL, CALIF.—M. W. Baird, architect, Bank of America Bldg., is preparing plans for a machine shop and factory for a client, 140 x 250 feet, to cost about \$180,000.

LOS ANGELES—Quality Screw Products Co., 1842 West Valley Blvd., has permit for factory building at 6036 Ferguson Dr., covering 1800 square feet, to cost about \$5600.

LOS ANGELES—Fiat Metal Mfg. Co., 1205 Roscoe St., Chicago, has permit for a plant building at 3449 Flower St., covering 15,000 square feet, to cost about \$68,000.

LOS ANGELES—William Modglin, 3225 San Fernando Rd., has permit for a machine shop at that address, 40 x 150 feet to cost about \$43,200.

LOS ANGELES—Hydraulic Press & Engineering Co., 5543 Alba St., has let contract to Miller-Saunders Co., 4426 Kingswell Ave., for a machine shop 75 x 116 feet, to cost \$27,000.

LOS ANGELES—H. Kramer & Co., 2460 Enterprise St., is taking bids on a two-story 130 x 200-foot warehouse and foundry and 50 x 104-foot laboratory and office building, with two 10,000-gallon oil storage tanks.

SAN BERNARDINO, CALIF.—Converse Rubber Co., Malden, Mass., plans a rubber products plant for the Central Manufacturing District, to cost over \$1 million. Anderson Nichols Associates, 210 West Seventh St., Los Angeles, are engineers.

SAN CARLOS, CALIF.—Mathews Conveyer Co., 300 Seventh Ave., San Francisco, has let contract to Wagner & Martinez, 181 South Park St., San Francisco, for a one and two-story sheet metal manufacturing plant 100 x 317 feet, to cost about \$140,000. Meyers & Evers, 1201 Kohl Bldg., San Francisco, are architects.

CONNECTICUT

NAUGATUCK, CONN.—United States Rubber Co. will erect a three-story mill building costing \$1,500,000 as an addition to its rubber footwear plant. Mixing and grinding operations will be concentrated in the new plant. W. E. Bittle is factory manager.

NEW HAVEN, CONN.—United Illuminating Co., 128 Temple St., has let contract to C. W. Blakeslee & Sons Inc., 58 Waverley St., for a 75 x 200-foot generating station, to cost over \$900,000.

STAMFORD, CONN.—Taylor Reed Corp., Glenbrook, Stamford, has plans by L. F. Caproni, 121 Chapel St., New Haven, for a one-story 80 x 350-foot and 80 x 80-foot plant, to cost about \$200,000.

ILLINOIS

CHICAGO—Verson All Steel Press Co., 1355 East 93rd St., has let contract to Norman Bouchard, Western Springs, Ill., for a one-story 100 x 156-foot foundry building, to cost about \$85,000.

INDIANA

FORT WAYNE, IND.—Salisbury Axle Division of Dana Corp., Bennett Rd., Toledo, O., has let contract to A. Bentley & Sons Co., 201 Belmont St., Toledo, for a one-story plant addition, estimated to cost over \$300,000.

HAMMOND, IND.—LaSalle Steel Co., Ham-

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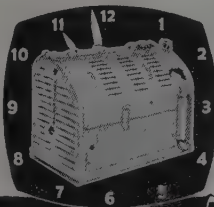
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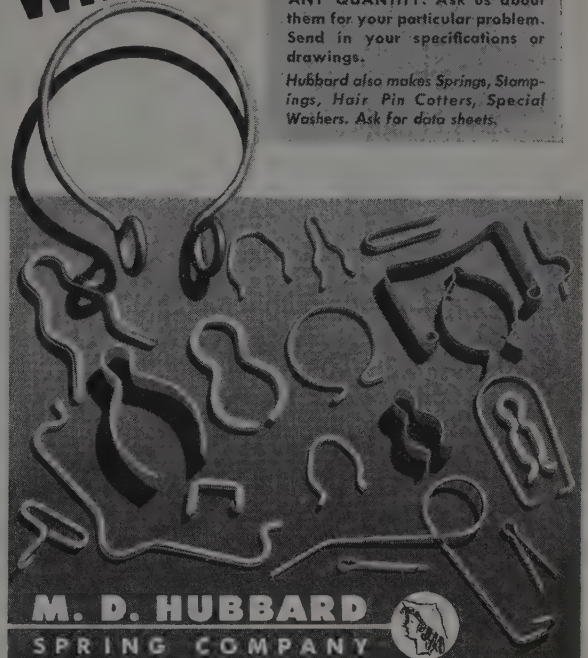
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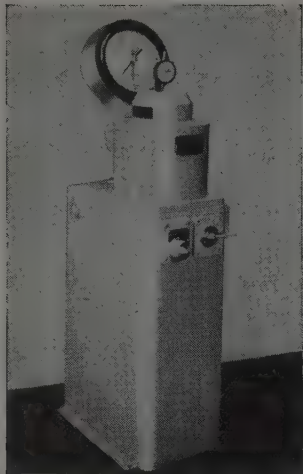
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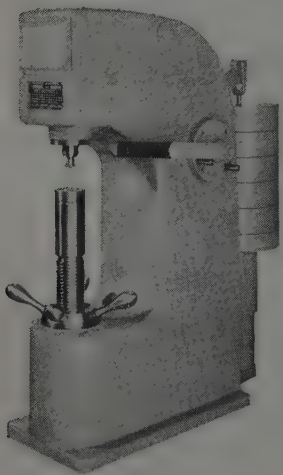
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mond, will let contract soon for steel plant additions to cost about \$75,000.

MASSACHUSETTS

QUINCY, MASS.—Pneumatic Scale Corp., 65 Newport Ave., has let contract to George A. Fuller Co., 11 Beacon St., Boston, for a one-story 145 x 224-foot plant to cost about \$250,000.

SOUTH WALPOLE, MASS.—Bird Machine Co. has let contract to Munroe-Langstroth Inc., 52 North Washington St., North Attleboro, Mass., for an 80 x 120-foot plant addition, to cost about \$100,000.

SPRINGFIELD, MASS.—Monsanto Chemical Co., 812 Monsanto Ave., has let contract to Adams & Ruxton Construction Co., 1387 Main St., for a one-story boiler plant, to cost about \$60,000.

SPRINGFIELD, MASS.—Package Machinery Co. has bought the war plant operated by Pratt & Whitney division, United Aircraft Corp., East Longmeadow, Mass., for \$1,750,000. Automatic wrapping and bottle-hooding machinery will be produced, employing 1500 workers, compared with 640 now. The present Springfield plant will be offered for sale.

MICHIGAN

DETROIT—Acme Foundry Co., 2503 22nd St., has let contract to Bennage & McKinstrie Co., 4612 Woodward Ave., for a foundry building costing about \$85,000.

OHIO

CINCINNATI—City, H. H. Kranz, city engineer, is building an incinerator plant at Hopple and Beekman Sts., to cost about \$750,000.

CLEVELAND—Ancco Products Inc. has been incorporated to manufacture automotive parts, Kenneth F. Wilson, associated with Cleveland Pneumatic Aerial Inc., 3781 East 77th St.

CLEVELAND—A-Brite Plating Co. Inc. has been incorporated to do commercial plating and has bought a plant at 2287 Woodland Ave. and will expand business. John Shope is president of the new company.

CLEVELAND—Le Roi Co., Milwaukee, has bought a plant at 12500 Berea Rd. and will equip it for manufacture of rock drills, mining and road-building machinery. Russell Morgan, United Bank Bldg., is representative.

YOUNGSTOWN—An addition of 26,000 square feet, costing \$75,000, is being built at the Mackenzie Muffler Co. plant in North Meridian Rd., to be occupied by the Buffalo Pressed Steel Co., a subsidiary, for manufacture of oil filters and other auto equipment.

YOUNGSTOWN—Great Lakes Carbon Corp., Robert F. Fahy, Baltimore, manager rock wool division, will build a plant covering 20,000 square feet for manufacture of rock wool insulation from steelworks slag, in North Meridian Rd., at cost of about \$250,000.

PENNSYLVANIA

BRIDGEPORT, PA.—Tube Methods Inc. has let contract to D. L. Reiff, 15 East Airy St., Norristown, Pa., for a one and two-story 140 x 140-foot plant and office building, to cost about \$100,000. G. A. Greeby, Montgomery Trust Bldg. Arcade, Norristown, is architect.

CORRY, PA.—Ajax Iron Works is expanding its plant by several additions to double capacity for gas pumping engines for oilfield use.

ERIE, PA.—American Sterilizer Co. plans a two-story plant addition 91 x 102 feet, to cost about \$65,000, to allow production expansion. Herman Zwicker is plant superintendent.

MEADVILLE, PA.—National Bearing Division of American Brake Shoe Co., E. A. Williams, works manager, 4930 Manchester Ave., St. Louis, has let contract to Ragnar Benson Inc., 4744 West Rice St., Chicago, for a

foundry 293 x 735 feet and 89 x 93-foot boiler house, to cost about \$2 million.

NEW BRIGHTON, PA.—Boro, Sixth Ave. and Ninth St., is having plans prepared by Michael Baker Jr., Baker Bldg., Rochester, Pa., for a sewage disposal plant and auxiliaries, to cost \$175,000 and incinerator costing \$50,000.

TENNESSEE

CHATTANOOGA, TENN.—E. I. duPont de Nemours & Co., Wilmington, Del., announces a third plant here for manufacture of nylon yarn, estimated to cost about \$20 million, on a 600-acre tract near Chattanooga. Application has been made for CPA approval.

CHATTANOOGA, TENN.—Columbian Iron Works is having plans prepared for a foundry plant to cost about \$275,000.

HUMBOLDT, TENN.—City plans sewage treatment plant costing about \$120,000. Hurt-Rosche, Hillsboro, Tenn., are engineers.

MEMPHIS, TENN.—Allis-Chalmers Mfg. Co., Gerald L. Malmø, branch manager, has zoning permission for a plant at Airways and Dunne Sts. for manufacture of industrial and agricultural machinery, to cost about \$40,000.

TRENTON, TENN.—City plans a sewage treatment plant to cost about \$115,000. Hurt-Rosche, Hillsboro, Tenn., are engineers.

TEXAS

EL PASO, TEX.—El Paso Natural Gas Co., El Paso, plans expansion of compressor station costing \$200,000, gas purification plant over \$200,000 and dehydration plant about \$200,000.

GARLAND, TEX.—Modern Cotton Machine Co., Garland, plans a plant for manufacture of a cotton picking machine, estimated to cost \$100,000. W. Wayne, Garland, is engineer.

HOUSTON, TEX.—Mosher Steel Co., 3910 Washington St., has let contract to Bace-Marshall Co., 4009 Center St., for a plant to cost about \$70,000.

FLANO, TEX.—Sure Heat Stove Co., 2124 North Harwood St., Dallas, Tex., plans a plant for manufacture of oil heaters, to cost about \$55,000.

TEXAS CITY, TEX.—Carbon & Carbide Chemical Corp., Texas City, will add to chemical plant, including equipment building, three pump houses, compressor building, furnace building and electric control houses, to cost over \$3 million.

WASHINGTON

ABERDEEN, WASH.—Grays Harbor Port Commission has let contract to Lamp Construction Co. for a 100 x 100-foot concrete warehouse structure.

ENUMCLAW, WASH.—H. I. Kyle, city clerk, will receive bids Aug. 27 for a municipal machine shop.

SPOKANE, WASH.—City has budgeted \$525,000 for construction in 1947 of a pumping plant at Trent, Wash., involving several buildings and equipment.

TACOMA, WASH.—War Assets Administration has approved sale to Hooker Chemical Co. of the local anhydrous aluminum chloride plant which has been operated by the Hooker Electrochemical Co.

WHITE SALMON, WASH.—Klickitan County Public Utility District No. 1, E. E. Clouse, manager, will call bids Sept. 16 for material and equipment involved in the proposed 340-mile transmission and distribution line, total cost of which is estimated at about \$400,000, in five schedules.

WISCONSIN

MILWAUKEE—Alfa Machine Co., 1305 North Fourth St., has let contract to W. W. Oeffin Inc., 5345 North Hopkins St., for a one-story 110 x 124-foot plant building, to cost about \$50,000.

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Steel 1946-09-02: Vol 119
Iss 10

INTERNET ARCHIVE

INTERNET



TEEL

ine of Metalworking and Metalproducing

NO. 10

SEPTEMBER 2, 1946

NEWS

stry Faces Three Busy Years	65
sks Higher Ceilings for Prepared Scrap	67
ures for Manufactured Products Established	68
Reduced Sharply To Speed Housing Program	69
rial Finishes Fails To Meet Demand	70
Move To Ease Transportation Crisis	71
Shipments Establish Record	72
onversion Is Three-Fourths Accomplished	77
Prices Rise	78
n France Generally Accepted as Satisfactory	79
ady Rise Despite Reconversion Problems	84
med Steel To Export Firm Halted by Navy	85

TECHNICAL

Tube Bending	94
1 Oven Eliminates Improper Processing	96
Glance	97
1 Inhibitors in Fine Grained Steels	98
1 Welded Structures	100
llurgy of Aluminum Alloys—Part III	102
Long Type Elevator Handles Delicate Parts	110
New Principle Developed for Thread Ring Gage Design	112
Double Action Cleaning Machine Utilizes Rotating Drum	118
Mineral Wool Insulation Standard Permits Ordering on Specification	120
Zinc Coating of Structural Members Provides Corrosion Protection	122
Duplicating Complicated Forms with a Profiling Machine	126
Hot-Dip Galvanizing Practice—Part III	127

FEATURES

As the Editor Views the News ..	61	Men of Industry	88
Present, Past and Pending	67	Obituaries	93
Windows of Washington	74	Industrial Equipment	130
Mirrors of Motordom	81	The Business Trend	152
Activities	86	Construction and Enterprise	170

MARKETS

Mills Expected To Open Books Soon for 1947	155
Market Prices and Composites	156
Index to advertisers	186

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Published every Monday. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year \$6; two years \$10; all other countries, one year \$12. Single copies (current issues) 25c. Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879. Copyright 1946 by the Penton Publishing Co.

Business Staff on Page 4



NEXT WEEK...

Special Report on Inventories and Delivery Promises
Corrosion of Ferrous Materials
Pneumatic Fatigue Testing of Gas Turbine Buckets
Determining Selling Prices for Industrial Products
Heat Treating Aluminum—Annealing Practices



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As the EDITOR

VIEWS

the NEWS

Tension in international relations towers above domestic issues in almost every nation. Friction at points in Korea, Manchuria, China, India, Iran, Iraq, Palestine, Turkey, Bulgaria, Greece, Yugoslavia, Italy, Austria and Germany—coupled with the deterioration of the Paris Conference into a sordid spectacle of name-calling—is causing thinking people to pause in their work of reconversion and to alert themselves to new dangers ahead.

These dangers do not necessarily mean war. The people of no nation want war. None has the resources with which to win an early or decisive victory. It would be folly for any nation to deliberately provoke war at this time.

Nevertheless, reckless leaders are taking terrific chances. Emboldened by the memory of policies of appeasement pursued by Western Nations when Mussolini, Hitler and Hirohito were on the make, Russia and her satellites seem to be trying to see how far they can go before their encroachments are challenged.

Our only safe answer to these feelers must be a prompt and unequivocal stand against unwarranted demands. To compromise or evade now—as we did in the Panay, Ethiopia and Saar incidents before World War II—is to make World War III inevitable.

To register this firm stand will take more than stern words from our State Department. It will require a drastic reshaping of national affairs.

First, we must recognize the expanded responsibilities of the State Department and act quickly to build it up to the requirements of the times. Ambassadors and consuls in trouble spots should be given more facilities. They should be freed of archaic red tape.

Secondly, the national budget should be revised drastically. Pare down the appropriations for fancy activities in the Commerce, Labor, Agriculture and other departments and earmark this money for the State Department and for military forces abroad.

Third, correct the mistake we made in demobilizing our armed services too rapidly. Give our commanding officers in Tokyo, Seoul, Berlin, Frankfurt and Vienna enough men so they can stop worrying about high turnover and inexperienced personnel.

Fourth, scrutinize the equipment and supplies American industry is manufacturing for foreign account under government directives. Hold up questionable shipments until the recipient nations clarify their positions to our satisfaction.

Finally, cultivate clear perspectives. The public should know that today a diplomatic error in Europe or Asia is a more serious threat to the prosperity of Flint, Allentown, Dayton or East St. Louis than most of the problems that confront us on the home front.

STEEL

September 2, 1946

STEADY WORK AHEAD? Prior to the war, Labor day was an unofficial dividing line between summer vacations and the fall working period. Employees who took vacations were back on their jobs by early September, refreshed and prepared to work steadily until the year-end holidays.

Labor day 1946 should be more significant in this respect than any of its predecessors. For one thing, the past summer was the first since 1941 in which the nation was not at war. Many persons

who had skimped on vacations for four years made up for lost time by taking extended pleasure trips this summer. Another important point is that this year vacations with pay were enjoyed by millions of employees who heretofore had taken time off only if they could afford to miss their paychecks for a week or two. The experience was so attractive to some that in addition to taking their with-pay vacations, they remained away another week or two without pay.

In view of all that has been said about the de-

(OVER)

creased productivity of labor, it will be interesting to see what happens during the next four months. It would be gratifying to think that with the season of extraordinary vacations out of the way, Labor day this year may usher in a period of increased attentiveness to the job and higher output per man hour.

—p. 84

• • •

WPB CHIEF RETURNS: Donald M. Nelson, former chairman of the War Production Board, is being recalled to Washington to lay the groundwork for the rapid mobilization of industry in case that becomes necessary. He will make a survey of materiel that would be required in waging another war. He also will draft a blueprint of the kind of a new War Production Board that would be needed if war should reoccur.

In assigning Mr. Nelson to these tasks, the government is acting prudently. At a time when there are so many points of friction throughout the world, it is well to keep alive a seasoned plan for industrial mobilization.

However, it is conceivable that Mr. Nelson can make an additional contribution to the government on his return to Washington. He is one of the few Americans who has seen Russia and talked with Joseph Stalin under exceedingly favorable conditions. His recollections of these experiences, pieced together with later information from other sources, might help official Washington to better understand the Soviet's latest puzzling behavior.

—p. 74

• • •

HOW NOT TO DO IT: Everybody applauds the apparent desire of the government to begin to make a creditable showing in helping to provide urgently needed homes for veterans, but many question whether the methods now being employed will accomplish the purpose.

The latest development in the confusion that has attended the housing program is the transfer to Housing Expediter Wyatt of certain functions formerly handled by Civilian Production Administrator Small. Simultaneously, sharp cutbacks in nonresidential construction have been ordered.

Government officials seem to be incapable of realizing that there are numerous craftsmen in commercial, industrial and other nonresidential construction whose talents cannot be employed on residential construction. Too drastic a cutback on nonresidential jobs simply throws them out of work, halts some commercial and industrial construction and does not contribute in any way to the building of more homes for veterans.

—p. 69

SIGNS OF THE TIMES: Naval officers who witnessed the atomic bomb tests at Bikini are convinced that the advent of this new weapon calls for an extensive redesign of naval vessels. They believe there will be substantial changes not only in hulls, masts, structural members and armor of the ships themselves (p. 76), but also in the design of valves, pumps, instruments, fittings and other accessories which proved "brittle" under the shock of atomic bomb attacks. . . . Disposition of about 5000 tons of steel, consisting chiefly of pontoon parts, has stirred up a hornet's nest. The steel, lying near Los Angeles, was turned over to WAA as salvage by the Navy. When WAA could not sell it as salvage (p. 85) the Navy took it back and offered it for sale as scrap to local consumers and dealers. A Hollywood exporter, not bound by OPA regulations, bid \$1.31 per ton over the OPA ceiling, was awarded the material and was planning to ship part of it to Argentina when Navy officials in Washington halted delivery to the exporter and ordered all bids destroyed. The tonnage involved is small but the confusion attending this episode shows that there is something wrong in the machinery for disposing of surplus war material. . . . Detroit Editor A. H. Allen points significantly to the likelihood (p. 81) that the automobile industry, now losing money on every car built, will continue to do so through the balance of the year, even though assembly rates now are well above what was once considered a break-even point. . . . Canada's industrial reconversion from wartime to peacetime production is three-quarters accomplished (p. 77) and should be completed next spring. . . . The author of a timely article on economic aspects of tube bending (p. 94) has this to say about manual and mechanical power: "A strong man, worth \$1 per hour, can generate 1/8 hp, so manpower costs \$8 per horsepower-hour during an 8-hour day. You can buy all the electric power you want for 2 cents per horsepower-hour." . . . The office machinery industry, consisting of more than 30 manufacturers, is working on a backlog of unfilled orders of about \$278 million (p. 65) and shipping machines at a rate of more than \$30 million a month. . . . Industrial sales of paint, varnish and lacquer (p. 70) account for a third of all paint sales in the nation.



EDITOR-IN-CHIEF

Office Machinery Industry Faces Three Busy Years

Demand for cost-cutting business equipment heavy. Backlog estimated at \$278 million. Manufacturing costs have increased sharply due to higher labor rates, but selling prices have advanced only moderately. Export market is promising

OFFICE machinery manufacturers, most of whom only recently have completed reconversion, are working on a backlog of unfilled orders approximating \$278 million.

Shipments are increasing as materials and components become easier and now are in excess of \$30 million a month.

The industry, which produced little of its regular line of machinery during the war years, estimates the accumulated deficit in this type of equipment is sufficient to assure three years or more of capacity production.

In some machines, notably those in which competition is keenest and consumer demand heaviest, there probably is some duplication of orders, but production has not yet caught up with tremendous requirements for high-speed, cost-reducing office equipment in this category to bring out the extent. For portable typewriters, duplicate orders are believed to be substantial; for cash registers, bookkeeping machines, duplicating machines or standard typewriters such ordering is thought to be slight.

Included also under office machines are automatic registers, calculating machines, check handling, coin and currency handling, dictating, adding, envelope handling, time recording and continuous handling machines. In addition to these major types, shorthand writing, punch card tabulating, addressing, microfilm and postal machines also are included.

Office machinery manufacture is a close-tolerance, precision, yet mass production industry. During the war the industry produced large quantities of precision instruments, fuze assemblies, fire control, carbines, automatic pistols and scores of other parts and products requiring tolerances in the fractional

thousandths. Production of typewriters, standard types, continued into 1943 before the all-out shift for war, although output of portables was halted earlier.

The stoppage in most types, coming rather suddenly, found the industry as a whole with a substantial inventory of parts, steel and components. This was stored as new materials came in for war goods and this inventory was an asset in early reconversion. Plant equipment, however, was badly snarled; many machines were worn out on war products, others unsuitable for normal output were replaced, and the first major reconversion problem was to get the plant into shape for civilian requirements, built up to record levels.

Plants ordered substantial new equipment, and although some machines are still undelivered, on the whole manufacturing departments are again in position for high output as reflected in heavier shipments each month. By mid-year,

1946, shipments had nearly doubled the early postwar period and are still increasing. But material and parts supply, including steel, has not paced progress made in plant and labor reconversion.

Bolstered with a fair inventory at the start of reconversion, new orders were placed for steel early and on this delivery was reasonably prompt. Production executives report that since that time delivery of raw materials has become progressively worse.

Presently steel supply is listed as bad. The left-over pre-war inventories have long since been consumed. Some estimate plants are not getting as much steel as consumed by 25 per cent. The industry requires about 75,000 tons a year, mostly premium grades.

For business machines, cold-rolled carbon strip in premium grades of light gages is a leading product; screw stock is also required in substantial quantities and precision requirements in finished products is reflected in steel specifications and grades.

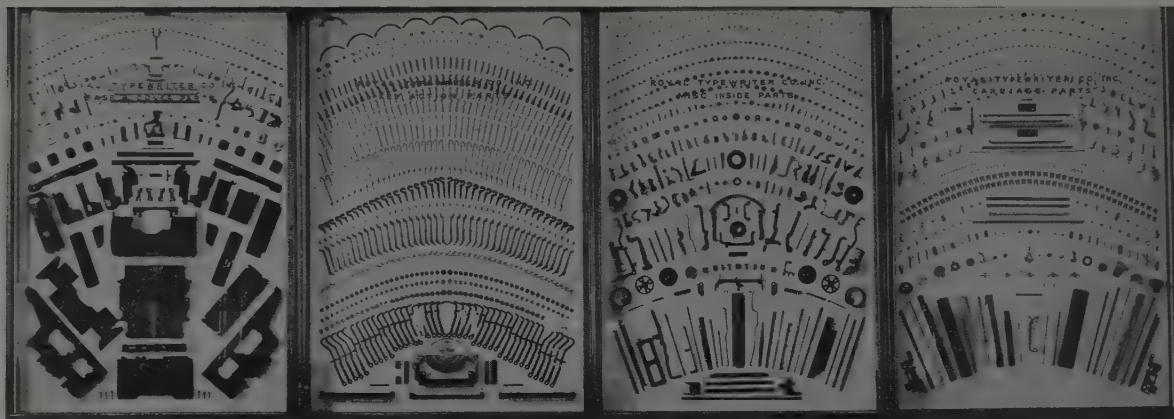
A trend is noted toward greater use of stainless in strip form for decorative purposes.

Castings, including die castings, enter



Typewriter parts are automatically plated at the Royal Typewriter Co. plant in Hartford, Conn.

By L. E. BROWNE
Associate Editor, STEEL



Count 'em! These are the parts that go into one Royal typewriter

into manufacture of machines by the thousands. Because of the shortages and extended deliveries in light iron castings, some parts have been re-designed for heavy stampings and steel stampings have taken a place in production programs, including typewriters, for which they may not be displaced. Considerable music wire and spring stock is also fabricated into parts.

Productive capacity has been expanded moderately. Some model changes are anticipated, although minor part changes and refinements are frequently and continuously being made in normal production runs. However, design and assembly of a complete new model of any office machine is a gigantic problem considering that a standard model typewriter has at least 1500 parts and some types considerably more, while an accounting machine consists of as many as 7500 parts.

The bulk of these parts are fabricated for assembly in machine builders' own plants; while some components are made by outside suppliers, relatively little work is farmed out. One component on which builders are dependent on others is fractional motors and the industry uses hundreds of thousands.

Motors have been and are a production bottleneck, but there are signs of an improvement. Bearings are also needed in large lots and some builders of office machines also assemble bearings, stamping racers and buying balls. Naturally, bearings required are in the smaller sizes and are not of the heavy-duty type; many are in the one-eighth inch size range, turned and machined.

Industry Fully Converted

Today the industry may be considered fully converted to peacetime production, but the changeover has not been without difficulties and required practically a full year to complete. In recent months the shortage of steel and other materials and components has been a retarding factor in the industry's effort to reach capacity output.

The increase in the costs of labor and materials has been another complicating factor. Employment in the industry approximates 50,000 and the ratio of labor costs to net sales is among the highest. Since the war, costs on some typewriters have gone up 50 per cent, while selling

prices have advanced only about 12 per cent.

About 30 companies produce the bulk of office machinery, although some of these concerns make other products as well. In dollar value, shipments of typewriters have been heading the list. Latest available figures have monthly typewriter shipments, standard and portable, valued at close to \$6 million; adding machines, \$3.1 million; calculating machines, \$3.0 million; and bookkeeping machines, \$2.5 million.

There are 10 plants manufacturing typewriters, the same number making automatic registers, 12 making check handling machines, 11 adding, and 19 producing duplicating machines. Unfilled orders are heaviest in typewriters, with bookkeeping machines a close second and calculating machines third. Indeed, if there is much duplication in the typewriter backlog, as some suppose in the portable end, bookkeeping machines may be first in dollar value. The supply pipe lines are far from filled with most types of office machinery.

Before the war normal production of typewriters averaged close to 1,000,000

Automatic testing and exercising of adding machines at the Bridgeport, Conn., plant of the Underwood Corp. These machines have only essential parts assembled; after exercising, motors will be attached and assembly completed



a year, 600,000 standard and 400,000 portable, but what might be tabulated as a normal prewar year for the industry as a whole is marked by high and low spots; 1941, for instance, was a near-record period, substantially over 1940.

On the market are several new types of dictating machines, some using steel wire and others plastic tape or records. Machines in which were incorporated the same principles were used in military service. There is a sharp increase in the use of postage meters; from this source postal revenue last year was \$211 million.

Portable microfilming machines may be expected to increase volume of record-keeping by microfilm, probably stimulated by V-mail war service.

Export demand is high and probably one-fourth may be marked for export. Foreign sales are expected to help to absorb large production with resultant decrease in costs. However, American business is in need of office machinery and while next year may witness a further easing in deliveries and supply, backlog of the industry is at an all-time high. War surplus is not expected to ease supply in the near future. Priority demand will keep the bulk of later models in government surplus off the market for several years.

Kaiser-Frazer Corp. Takes Lease on Blast Furnace

Kaiser-Frazer Corp., Willow Run, Mich., has leased for three years the "Anna" blast furnace of Struthers Iron & Steel Co., Struthers, O. The stack has a daily capacity of about 500 tons. It had been operated as a merchant stack but has been down since last fall because of high operating costs and government ceilings on prices.

New Open Hearth Planned For Otis Steel Co. Plant

Jones & Laughlin Steel Corp., Pittsburgh, plans to construct a 175-ton open-hearth furnace at the Riverside plant, Cleveland, of its subsidiary, Otis Steel Co., Cleveland. The new furnace will be the ninth open-hearth unit at the plant and will increase output there about 12½ per cent.

Kelly Steel Works Inc. Sold To Youngstown Company

Kelly Steel Works Inc., Chicago, has been sold to Commercial Shearing & Stamping Co., Youngstown, which will expand the Chicago firm and operate it, as a wholly owned subsidiary.

Advisory Committee Recommends Higher Prices for Prepared Scrap

NEW YORK

HIGHER price ceilings for prepared scrap were awaited by the industry last week-end following recommendations for such action by the OPA Industry Advisory Committee at a meeting here Aug. 28.

While no specific figure was asked by the committee, observers believed the increase will be less than the \$3.50 a ton advance requested by the directors of the Institute of Scrap Iron & Steel a few weeks ago. However, a spread of \$5 between prepared and unprepared is reported to have been recommended by the advisory committee. This would compare with the present differential of \$3.50. Committee also suggested freezing of the buying price on unprepared scrap.

This is the first time the advisory committee has recommended an increase on prepared scrap, having rejected applications for higher prices on at least two previous occasions.

Industry observers believe the higher prices, if and when announced, should provide the flow of scrap with a badly needed impetus. Normal flow of mer-

chant scrap recently has dropped about 50 per cent in some districts, pending action of the price appeals of the scrap industry.

An increase in prices, even if it should be less than the \$3.50 requested by the Scrap Institute directors, would provide some relief and should reduce bartering, upgrading and other measures taken in recent weeks to get around the ceilings.

The shortage in scrap likely will continue for some time, although higher prices are expected to improve the situation. The shortage continued a barrier to maximum steel production all through August.

A survey of producers by the Committee on Iron & Steel Scrap of the American Iron & Steel Institute revealed that at least one large producer has almost entirely exhausted its inventory. Several other plants have less than a one-week supply on hand. Three plants reported 10 days' supply, one has 11 days' supply on hand and four have 15-day inventories. Some other plants are more favorably situated but most have less than a month's supply in their stockpiles.

Present, Past and Pending

■ GOVERNMENT TO RELEASE HIGH-GRADE ZINC TONNAGE

WASHINGTON—Limited release of high-grade zinc from government stockpile has been resumed to stave off impending shutdown of a number of zinc-consuming plants. Monthly output is running 31,416 tons less than normal consumption. Applications for zinc should be sent to CPA.

■ SETTLEMENT OF CANADIAN STEEL STRIKE STILL BLOCKED

TORONTO, ONT.—No progress is reported toward settlement of the strike directly affecting the three big basic steel producers in Canada. Steel Co. of Canada Ltd. is maintaining production but not shipping. About 100,000 workers in consuming plants have been laid off owing to the shortage of steel.

■ JACK & HEINTZ GETS FORD CONTRACT FOR ENGINES

CLEVELAND—Jack & Heintz Precision Industries Inc. has received a contract from Ford Motor Co. for 12 experimental light-weight engines for use in automobiles. If engines prove satisfactory, Ford will take 800 engines a day.

■ WAA REOPENS BIDDING FOR SOUTH CHICAGO STEEL PLANT

WASHINGTON—War Assets Administration has reopened bidding for purchase or lease of the government's \$92 million steel plant in South Chicago, Ill., now under interim lease to Republic Steel Corp. New bids must be received prior to 3 p.m., Sept. 30.

■ U. S. STEEL SUBSIDIARY BUYING DIESEL-ELECTRICS

BIRMINGHAM, ALA.—Tennessee Coal, Iron & Railroad Co. is substituting 27 diesel-electric locomotives for 33 steam-powered locomotives now used in its transportation department. The program is expected to be completed by 1949.

■ LAST OF THREE NUT AND BOLT PLANT STRIKES SETTLED

CLEVELAND—Settlement of a strike at National Screw & Mfg. Co. last week brought to an end the last of three long closings by important nut and bolt suppliers to the automotive and other industries.

Price Decontrol Procedures for Manufactured Products Set Up

Requests for decontrol must originate with industry advisory committees serving Office of Price Administration and be presented through a newly organized Decontrol Division of OPA. Action on requests will be taken within 15 days

PROCEDURES which manufacturers must follow in seeking price decontrol of their products are established by the Office of Price Administration in procedural regulation 17, now effective.

Requests for decontrol under terms of the Price Control Extension Act must originate, for the time being, with industry advisory committees serving OPA and be presented through a newly organized Decontrol Division of the agency headed by John Bulkley, deputy OPA administrator for decontrol.

OPA was directed under terms of the act to terminate price controls on non-agricultural commodities (a) by Dec. 31, next, where the commodity is not important to business or living costs and (b) whenever the present supply of a product exceeds or is about in balance with demand, including inventory requirements.

The general procedure under the new OPA regulation in seeking decontrol is as follows: An industry advisory committee must first file a formal petition for decontrol, showing in its petition its reasons for thinking the present supply-demand relationship of the commodity warrants decontrol. The request must be supported by a thorough analysis of current production and its relationship to demand, together with substantiating evidence to support the analysis.

Data Suggested as Evidence

Suggested as substantiating evidence are such data as: Well-grounded estimates of demand at all levels of distribution; industry surveys of current production made by trade groups or research organizations of a representative sample of companies; surveys of raw material and labor supplies and geographical distribution, and any other statistical information available.

OPA emphasized that in determining whether production matches demand the tests would be: "Can those who buy the commodity for their own use at the existing ceiling prices do so with the same facility and width of choice they had before the development of wartime pressures and is this a purely fleeting condition or is there reasonable likelihood that it will continue?"

The agency suggests that, since com-

parison with prewar buying conditions is essential to the determination, parallel data for a typical prewar year be supplied. This should be supplied for exactly the same selling period as the current data.

Within 15 days of receiving the peti-

tion, OPA will approve or disapprove the request. If the committee requests a formal hearing, the agency will hold one within ten days of being requested, but consumer and labor advisory committees of OPA also will be extended an invitation to be heard.

In event of an adverse decision after the formal hearing, the committee can then appeal to the Price Decontrol Board, which will be the final tribunal.

Whenever an industry advisory committee decides to meet to consider the advisability of requesting decontrol, the meeting agenda must so state, and representatives of OPA's Decontrol Division and other OPA staff members must be privileged to attend.



BACK TO WORK: Seamen on Great Lakes vessels affected by the strike of the National Maritime Union were returning to their ships last week as agreements were reached between fleet operators and the union providing for a 48-hour week at sea and a 44-hour week in port. Although only a small proportion of the total lakes fleet was affected directly by the strike, fears were held that the movement of coal and iron ore would be seriously disrupted. Operators of vessels not affected by the strike were reported preparing to match the wage gains granted to NMU-organized ships.

NEA photo

Industrial Building Is Reduced Sharply To Speed Housing Program

Nonresidential construction to be limited to \$35 million a week against former ceiling of \$48 million. National Housing Expediter Wyatt to handle housing priorities and cutbacks in non-housing programs

SHARP cutbacks in nonresidential construction, increased priorities for housing materials and further price relief for producers of building materials were ordered last week as the government moved to give the housing program preference over industrial construction and production programs.

Apparent winner in the contest for scarce materials was National Housing Expediter Wilson Wyatt. Mr. Wyatt will take over the job of handling housing priorities and cutbacks in nonhousing construction formerly handled by the Civilian Production Administration under John D. Small.

Some observers predicted that the added emphasis to be given the housing program may result in still further shortages of pig iron and other critical materials for the production of automobiles, railroad equipment, consumer durable goods and other critically needed goods.

The National Housing Authority last week issued regulation No. 5 under which the number of critical items is expected to be doubled and the amount of set-asides for housing increased up to 100 per cent of total output on some items. The agency said the new regulation, which succeeds that of the CPA, will not affect applications already approved or make major changes in the priorities system.

At the same time, CPA Administrator John Small said he was prepared to transfer 1500 members of his staff and the funds supporting construction activities of the CPA to Mr. Wyatt's office. Mr. Small also endorsed a 27 per cent further cutback in nonresidential construction in order to get "every new home finished by the time the snow flies."

Beginning Sept. 10, all new applications for construction authorization and "HH" priorities will be filed with the NHA while compliance functions relating to the use of these rating set-asides and other restrictions on dealers, wholesalers and manufacturers will still be handled by CPA's Compliance Division.

NHA has delegated to the Office of Price Administration the job of enforcing the maximum sales prices and veterans preference requirements of the veterans housing program.

Under the new program, amount of construction permitted for commercial, industrial and institutional purposes has been cut \$13 million to \$35 million a week. The present ceiling on nonresidential construction is \$48 million and CPA has been authorizing applications recently at the rate of about \$45 million.

In view of the tremendous demand for building materials in the present intensive drive for new housing, CPA issued a warning that no stockpiling of building materials in anticipation of future construction is permitted.

The following actions, effective Sept. 1, were also announced last week by the CPA and NHA:

1. Dealers and distributors must reserve for priority ratings 75 per cent of their receipts for 43 of the 57 materials listed on schedule A of priorities regulation 33 and even larger proportions must be set aside for the remaining 14 materials.

2. Addition of 27 materials in short supply to schedule A, making a total of 57, assures builders that they can secure the principal materials necessary to construct and complete houses.

3. Producers' nonhousing output of cast iron soil pipe limited to 7 per cent of their previous month's tonnage.

4. No person shall use cast iron soil pipe for any purpose except installing, repairing or maintaining sewage disposal systems in buildings, and that such pipe shall not be used beyond 5 feet from the building line, except for replacements (effective immediately in cities that have codes consistent with its provisions; Oct. 1 in all other cities).

Ten of the 14 materials whose set-aside ranges upward from 75 per cent also are listed in a new section of PR-33 which is known as schedule B. The materials and set-asides are in part: Bath-tubs, 95 per cent; kitchen sinks, 75 per cent; lavatories, 90 per cent; water closets, tanks and bowls, 90 per cent; cast iron soil pipe and fittings (under 5 inches), 80 per cent; warm air furnaces, and radiation, 75 per cent each.

July Pig Iron Output Best in 12 Months

Despite the fact that pig iron supply is far short of needs of steelmakers and foundry operators, July production at 4,705,277 net tons was best since July, 1945, when 4,801,457 tons were made, according to figures by the American Iron & Steel Institute. The July total compares with 3,682,273 tons turned out in June, a gain of 1,023,004 tons. Percentage of capacity engaged in July was 82.4, compared with 66.5 in June and with 84.1 in

July, 1945. The July total includes 55,235 tons of ferromanganese and spiegeleisen.

Cumulative tonnage for seven months this year is 22,512,098 tons, compared with 33,954,702 tons in the comparable period last year, representing 57.5 per cent of capacity, compared with 86.8 per cent for seven months in 1945. The decline for seven months totaled 11,442,604 tons, a deficit sufficient to account for the current shortage.

Blast Furnace Capacity and Production—Net Tons

JULY - 1946

	Number of companies	Annual blast furnace capacity	PRODUCTION							
			PIG IRON		FERRO-MANGANESE AND SPIEGEL		TOTAL			
			Current month	Year to date	Current Month	Year to date	Current month	Year to date	Percent of capacity	
									Current month	Year to date
DISTRIBUTION BY DISTRICTS:										
Eastern	12	12,988,970	833,981	4,092,674	29,262	118,708	863,243	4,211,382	78.4	55.8
Pittsburgh-Youngstown	16	25,959,940	1,878,364	8,559,369	19,084	68,792	1,897,448	8,628,161	86.5	57.3
Cleveland-Detroit	7	6,557,500	483,488	2,527,756	-	-	483,488	2,527,756	87.0	66.4
Chicago	7	14,093,510	1,010,336	4,819,447	-	-	1,010,336	4,819,447	84.6	58.9
Southern	9	4,924,670	330,640	1,648,964	6,889	53,976	337,529	1,702,940	80.9	59.5
Western	5	2,836,000	113,233	622,412	-	-	113,233	622,412	47.1	37.8
TOTAL	37	67,340,590	4,650,042	22,270,622	55,235	241,476	4,705,277	22,512,098	82.4	57.5

High Output Fails To Meet Demand

Dollar volume of sales of industrial paints, varnishes and lacquers is nearly double prewar level, but demand is so great that apparent shortage exists. Bright outlook seen for porcelain enamel

By VANCE BELL
Associate Editor, STEEL

TODAY'S apparent shortage of some industrial finishes results not from low production of finishes but from a terrific demand that has pushed current output of some types of finishes to a level nearly 100 per cent above that which prevailed just before World War II started. In fact, the current production of some finishes is the greatest of any in the past ten years, except for 1945 when war production was at its zenith.

Limiting producers of some types of finishes from stepping up their output further is the difficulty of obtaining raw materials.

Even greater demand would exist for the present supply of finishes if steel, particularly sheets, were available in greater quantities to steel consumers, many of whom apply protective and decorative finishes to their metal products.

Indicative of the huge demand for finishes is a report by the National Paint, Varnish & Lacquer Association Inc., Washington, that industrial sales of paint, varnish and lacquer by 680 establishments representing 90 per cent of the volume in the United States totaled \$23,653,045 in June, compared with \$12,585,597 in June, 1939, and \$26,302,893 in June, 1945. Sales for the first half of 1946 amounted to \$130,950,922, compared with \$69,409,601 in the first half of 1939 and \$150,120,075 in the first half of 1945.

Third of Sales Are Industrial

Industrial sales of paint, varnish and lacquer account for approximately one-third of all paint sales in the nation. Total sales in June were \$66,065,330 and for the first half of 1946, \$386,755,508.

Because of the huge backlog of demand for products of all types, a great many of which require a finish of some kind, the manufacturers of industrial finishes foresee a bright future. For example, R. L. Turk, president of the Porcelain Enamel Institute, Washington, and vice president of Pemco Corp., Baltimore, said, "the future would be bright even if there were no new markets for porcelain enamel. There are, however, endless new markets that have developed

because of wartime experimentation." Preparing for this demand, one large producer of porcelain enamel is building two new plants to augment its capacity. While shipments of porcelain enameled products currently are higher than they were a year ago, they would be considerably greater if enamelers could procure all the enameling sheets they need. Nevertheless, shipments of porcelain

enameled products in May totaled \$5,777,000, compared with \$3,178,000 in May, 1945, and \$6,151,000 in April, 1946.

Discussing new possibilities for porcelain enamel, Mr. Turk cited work in the exhaust and muffler field. Previously, in the transportation field porcelain enamel, he pointed out, was thought of only in connection with decorative installations. "During wartime, experimentation with exhaust pipes and mufflers to discover a material that would eliminate or minimize the high replacement rate on these parts, porcelain enamel proved its value. Special formulas able to withstand extreme



Although there is demand today for practically all the industrial finishes that can be made, producers of finishes are mindful of the day when the supply may exceed the demand and are constantly striving to improve their products and thus strengthen their competitive position. Illustrative of such efforts is this scene in a paint company research department where a finish is being sprayed on a radio cabinet for test purposes

Government Moves To Ease Transportation Crisis; Shorter Turn-Around Time Asked

EMERGENCY action by eight governmental agencies to avert the threatening transportation crisis arising from the shortage of freight cars and a heavy and increasing volume of freight traffic was ordered last week by Reconversion Director John Steelman.

Railroads estimate they are short about 1,000,000 cars. New car construction has been slowed by strikes and the shortages in steel, lumber, castings and other essential materials. Transportation officials fear that by the middle of next month when carloadings reach a seasonal peak, 50,000 to 75,000 carloads of freight may be backing up weekly, causing a backlash in the country's entire economy.

Agencies called upon to help alleviate the situation include the Civilian Production Administration, Office of Defense Transportation, War Shipping Administration, Maritime Commission, National Housing Administration, Office of Price Administration, Department of Agriculture and Department of State.

To meet the emergency, Mr. Steelman said the following steps will be taken:

1. Wherever possible cross country freight will be diverted to intercoastal or coastwise shipping.
2. OPA will promptly review increased costs arising from such diversion.
3. CPA will speed scarce materials needed to repair 80,000 old cars and build 40,000 new ones this year.
4. ODT will encourage shippers and receivers to shorten the turn-around time, even to unloading and loading cars on week-ends.
5. ODT will tighten regulations on 1cl shipments.
6. ODT and Department of Agriculture

will co-operate to eliminate bottlenecks which threaten perishable foods.

7. State Department will seek prompter placement of foreign orders for freight cars to be built in this country to stimulate production on domestic orders.

Tool & Die Association Schedules Annual Meeting

National Tool & Die Association will hold its annual meeting at the Congress Hotel, Chicago, October 23-26, 1946. General sessions are to be on Thursday and Friday, Oct. 24 and 25, with annual dinner and social gathering on Friday evening.

The association, of which Richard F. Moore, president, Moore Special Tool Co. Inc., Bridgeport, Conn., is president, includes in its membership leading contract die and tool shops throughout the country—about 70 cities from coast-to-coast being represented.

ASTE Meeting To Be Held In Pittsburgh Oct. 10-12

Semiannual convention of the American Society of Tool Engineers, which will be held at the William Penn Hotel, Pittsburgh, Oct. 10-12, will have as its theme "better goods at lower prices while paying higher wages," A. M. Sargent, president of the society, announced recently.

Highlights of the program include seminars on technical subjects, visits to industrial plants in the Pittsburgh area, showing of engineering films and the semi-annual banquet.

Calendar of Meetings . . .

Sept. 9-12, American Mining Congress: Annual Metal Mining Convention and Exposition, sponsored by the Western Division, AMC, to be held at Denver. Julian D. Conover, 309 Munsey Bldg., Washington, is secretary.

Sept. 10-14, American Chemical Society: Semi-annual meeting and National Chemical Exposition, Coliseum, Chicago, sponsored by the Chicago section, ACS. Show headquarters are at 1513 S. Wabash, Chicago.

Sept. 11-12, Society of Automotive Engineers: National tractor meeting, Hotel Schroeder, Milwaukee. John A. C. Warner, 29 West 39th St., New York 18, secretary and general manager.

Sept. 12-14, National Association of Foremen: Annual convention, Forest Park Hotel, St. Louis. Association headquarters are at 11 W. Monument Bldg., Dayton 2, O.

Sept. 14, Central District Enamellers' Club: Golf tournament and clambake, Aurora

Country Club, Aurora. O. H. F. Bond, Ferro Enamel Corp., Cleveland, is handling reservations.

Sept. 16-20, Instrument Society of America: National Instrumentation Conference and exhibit, William Penn Hotel, Pittsburgh. Richard Rimbach, Pittsburgh, secretary.

Sept. 21, Second annual symposium on "Modern Metal Protection:" Hotel Cleveland, Cleveland, sponsored by the local sections of American Chemical Society, American Institute of Chemical Engineers and Electrochemical Society.

Sept. 30-Oct. 2, American Society of Mechanical Engineers: Fall meeting, Boston. C. E. Davies, 29 West 39th St., New York 18, secretary.

Oct. 1-4, Association of Iron & Steel Engineers: Convention and Iron and Steel Exposition, Public Auditorium, Cleveland. Association headquarters are at 1010 Empire Bldg., Pittsburgh.

heat and corrosion far outlasted all other materials and metals. In addition, research found that the porcelain enamel coating on ordinary steel would stand up even when subjected to constant high temperatures.

"As a result, today we find a definite trend towards the use of porcelain enamel for exhaust and muffler parts, not only in the automobile industry, but in airplane manufacture as well. This," Mr. Turk said, "is just a specific example of the many cases where porcelain enamel, because of wartime developments, can look for a vastly widened future market."

Both the porcelain enamel and the paint industry have considerable capacity that is not being utilized. The former industry finds it unnecessary to operate at capacity because of a shortage of enameling sheets, and the paint industry is operating on only a 40-hour week because its supply of raw materials is not sufficiently large to warrant longer operation.

Supply of Flaxseed Reduced

The difficulty of obtaining raw materials stems from the war's drain on supplies, price ceilings, and strikes. In some quarters, diplomatic relations are also blamed. As to the latter, some industrial paint men say that Argentina, which normally supplies the bulk of the flaxseed from which linseed oil is made, is withholding flaxseed because of strained relations between that country and the United States. Some say that Argentina is diverting flaxseed to England and Russia. Whether it is because of price or diplomatic reasons that Argentina is withholding flaxseed from the United States, the U. S. Commerce Department reports that little flaxseed is coming to this country. Imports of flaxseed in April, 1946, were 2000 bushels, compared with 646,000 bushels in April, 1945. In March, 1946, they were 432,000 bushels, compared with 803,000 in March, 1945.

The demand for finishes would be even greater than it is today had not strikes interfered with industrial reconversion and the establishment of new businesses.

Among handicaps facing paint makers is a shortage of steel shipping containers. Most industrial paints are shipped in either five-gallon cans or 55-gallon drums. The container shortage is more critical with respect to the five-gallon cans because they are usable but once, whereas drums usually are returned to the paint maker and refilled.

Regardless of the present handicaps, makers of industrial finishes are optimistic because the rising rate of industrial production indicates a continued heavy demand for protective and decorative finishes.

July Mechanical Press Shipments Establish Record

Backlog of orders totals \$39 million, equivalent to 12 to 13 months' production. Diemaking capacity well booked

CLEVELAND

SHIPMENTS of mechanical presses increased to a new all-time high in July and are expected to remain at a high level through August. The value of mechanical presses and replacement parts shipped in July rose to \$3,712,000 compared with \$1,462,000 in June and were more than four times the monthly shipments of \$865,000 in July, 1939.

The July figure is the more remarkable because some plants were closed during part of the month for vacations. The record was attained partly through the shipment of some finished presses which had been waiting for electric motors and controls. While expansion of facilities accounts for part of the increased output, improvements in methods and equipment are also important factors.

Backlog of orders remains on an average of 12 to 13 months, with an estimated total value of \$39 million.

Some buying has been withheld due to the difficulty in obtaining necessary dies. Very few diemakers in this district can take on additional business for delivery over the balance of this year and some are booked into the second quarter of 1947. The pattern supply situation has eased considerably during the last 30 days and is not a serious problem at present.

To Speed Sales of Welders

War Assets Administration plans to speed up the disposal of surplus resistance welder machines. More than 1900 of the welders, costing \$10 million when new, have been turned over to 14 regional WAA offices for disposal, and more such equipment undoubtedly will be declared surplus by agencies which acquired it during the war.

Representatives of the industry declare that the manufacturers of the equipment are in the best position to sell it to private industry, and they advised that the disposal could be accomplished rapidly, but said that WAA must allow sufficient profit to make the disposal worth the manufacturers' efforts.

Representatives of the industry recommended that a wholesale price on this equipment be established for the manu-



SURPLUS TOOLS: Scheduled to be sold last week under the auctioneer's gavel was a large number of lathes and other machine tools, a portion of which are shown above. The tools, which were crated and ready for sale, were valued at \$54 million and were located at the Lincoln Ordnance plant at Madison, Ill. NEA photo

facturers, in order that they might purchase the equipment at a mark-down, recondition it, and sell it with a guarantee. The industry has an interest in wanting to see that the proper machine, in proper condition, goes into the proper plant in order that the customer may be satisfied with the equipment.

Machines which are highly specialized, such as for welding steel landing mats for combat airports, and have no peacetime uses should not be scrapped but should be sold on a sealed bid basis in order that their valuable component parts might be recovered, the industry recommended.

WAA was also advised that stocks of spare parts for the welders should be offered to the manufacturers of the parts, who have sales outlets through which they can dispose of them.

Tool and Die Makers Strive To Save Training Program

The National Tool & Die Manufacturers Association, Cleveland, has appealed to the Veterans Administration to help prevent the veterans' training program from being disrupted by a new law that drastically reduces federal benefits which have supplemented wages paid to men learning trades.

The association charges that the new law (S. 2477, amending the GI Bill of Rights) was slipped through Congress

without hearings during the last week of the session. Federal benefits supplementing wages have made it possible, the association pointed out, for an ambitious veteran to finish his industrial training course even though he has a family to support. The training program, the association said, had promised to go far toward relieving the present serious shortage of tool and die makers.

Cincinnati Tool Builders Will Maintain Operations

Cincinnati—Trends in the machine tool market are unchanged. Despite some tapering, during recent months, in new ordering the district manufacturers will maintain production schedules at current or higher levels to cut backlogs. A position making for quicker deliveries is sought.

Chicago & North Western's Tool Purchases Heavy

Chicago — By the end of this year Chicago & North Western Railroad will have spent \$3,800,000 on its program started in 1944 for the purchase of shop machinery, tools and other work equipment to modernize its facilities.

New shop and power plant machinery and tools alone involve a cost of approximately \$3 million.

GOVERNMENT CONTROL DIGEST

Weekly summaries of orders and regulations issued by reconversion agencies. Symbols refer to designations of the orders and official releases. Official texts may be obtained from the respective agencies

OFFICE OF PRICE ADMINISTRATION

Carbon Products: Increases in ceiling prices of electric motors, generators, converters, etc. which were effective as of May 13, may not be applied to carbon, graphite and metal-graphite brushes and contacts. This action is effective Aug. 28. (MPR-136; OPA-T-4910)

Automobiles, Farm Equipment: Firms performing repairs and maintenance services on automotive vehicles and farm equipment have been provided with an automatic adjustment formula for changing their charges for labor and a similar formula for adjustment of prices on fixed-charge jobs. (MPR-165; OPA-T-4916)

"Freeze" Prices: Resellers of products sold at wholesale or retail under "freeze" ceilings are permitted to figure Mar. 31, 1946, percentage mark-ups and to apply these mark-ups to current costs of acquisition. This permits them to pass on increases granted suppliers since that date. (SO-176 to GMPR; OPA-T-4921)

Armored Cable: Resellers of armored cable granted a percentage pass-on of two general increases granted manufacturers of armored cable on May 8 and June 14, averaging 27 per cent. (MPR-82; OPA-T-4923)

Brass and Bronze Ingots: Brass and bronze ingot prices increased to cover producers' loss in melting scrap resulting from increased scrap prices after June 3. Effective Aug. 27, maximum prices of 85-5-5 (red brass), yellow brass, 88-10-2, and 80-10-10 bronze ingot groups increased 0.25c per pound. Producers of trade name ingots may increase prices by 2.375c per pound of copper contained and 1.75c per pound of lead contained in their alloy ingots. (MPR-202; OPA-T-4924)

Brass Mill Products: Distributors' maximum prices for brass mill products increased 3.04 per cent, effective Aug. 23. In effect, this increase replaces the dollar-and-cent pass-on formerly allowed resellers with a percentage pass-on. (MPR-408; OPA-T-4927)

Beehive Oven Coke: Maximum prices for beehive oven coke produced in the Connellsville district of Pennsylvania increased \$1.35 per net ton for hand-drawn coke and \$1.25 for machine-drawn coke, effective Aug. 22 (MPR-77; OPA-T-4928)

Lead Products: Resellers of lead products may raise their maximum prices enough to restore their Mar. 31, 1946, percentage mark-ups. (SR-14C; OPA-T-4933)

Industry Advisory Committees: Industry advisory committees authorized to petition for decontrol of commodities subject to price control, and to petition for price adjustments in accordance with new manufacturers pricing standards. (Procedural Reg. 13; OPA-T-4936)

Wire and Cable: Manufacturers using silver in producing wire and cable may raise ceiling prices for these products by the same amounts as their silver costs have been increased, effective Aug. 23. (MPR-82; OPA-T-4937)

Lead: Dealer premiums for resellers of primary and secondary lead advanced to restore their average percentage mark-ups in effect Mar. 31. New premium differentials for resellers of lead on a cents per pound basis, fob point of shipment, over the maximum carload base prices are: 0.85c, 20,000 lb and less than a carload; 0.95c, 10,000 lb and less than 20,000 lb; 1.30c, 2,000 lb and less than 10,000 lb; 1.90c, less than 2,000 lb. (MPR-69 and 70; OPA-T-4940)

Copper: Premiums for copper resellers raised 1/2-cent per pound in each quantity sales bracket, effective Aug. 23. (MPR-15; OPA-T-4941)

Construction Materials: Resellers of nine types of building and construction materials permitted to increase ceiling prices by the percentage amount of the increased acquisition costs resulting from inbound rail freight increases since Mar. 31. (SO-179; OPA-T-4942)

Building Materials: Resellers of following items are permitted to restore their Mar. 31, 1946, percentage mark-ups: Lead pigments and lead paste products, in the east central, south central and eastern areas; metal lath in the Ohio-Michigan production area. Several other categories also were covered by the action. (GMPR MPR-188, 45, 206, 224, 466, and 592; OPA-6731)

Vises: Interim price increase granted manufacturers and resellers on vises May 1 has been raised from 8 per cent to 17 per cent, effective Aug. 23. (MPR-136; OPA-T-4943)

Warm Air Furnaces: Maximum prices for warm air furnaces (24 in. and smaller) raised by 10 per cent over June 30 price ceilings, effective Aug. 28. (MPR-591; OPA-6724)

Compressors: Resellers' ceiling prices for compressors and condensing units, 5 horsepower and less in capacity, and service parts, therefore, warm air furnaces, floor and wall furnaces, cast iron radiation and accessories, specified tanks and vessels, brass plumbing fixture supply fittings and trimmings and waste fittings and trimmings have been increased, effective Aug. 23. (MPR-272, 591, and 96; OPA-6735)

By-Product Coke: Distributors of by-product and retort gas coke have been provided with a procedure to fix new individual price ceilings that cover their average current costs plus their average percentage discount or mark-up in effect on March 31, 1946. Distributors of by-product coke sold for use in foundry cupola or blast furnace are excluded from the new pricing procedure because their March 31, 1946, maximum prices did not provide a margin for their sales. Instead, flat dollar-and-cent maximum prices were fixed and these distributors were able to buy and resell only because of price concessions by their suppliers. (MPR-29; OPA-T-4945)

Nails: Ceiling prices for retail sales of standard wire nails raised, effective Aug. 23, in an action which brings the retail sales of nails under one regulation and which reflects the increases previously authorized for nail manufacturers and jobbers. (SR 14 to GMPR, SO-151; OPA-6725)

Machines and Industrial Equipment: Resellers' ceiling prices for machines, machine parts and industrial equipment raised, effective Aug. 23, as follows to reflect the full percentage mark-ups of recent increases in their manufacturers' maximum prices: Gears, pinions, sprockets, speed reducers and chains, 13 per cent, and gear motors, 13 to 27 per cent as listed in a table of net unit increases applicable to any gear motor made and sold as a unit; fans and blowers 9 per cent for fractional and 14 per cent for integral horsepower motors; meat packing and poultry processing machinery and equipment, 8.5 per cent; gasoline pumps, power operated, 6.9 per cent; bakery machinery and equipment, 9 per cent; steel power boilers and equipment, 16 per cent. (MPR-136; OPA-T-4929)

CIVILIAN PRODUCTION ADMINISTRATION

House Trailers: Manufacturers of house trailers for veterans have been made eligible for priorities assistance in getting materials. This assistance will be in the form of authority to use an HH priority rating or to place certified orders for minimum quantities of

materials needed to produce VEHP house trailers. Manufacturers are to apply to the National Housing Agency, Washington 25, on form NHA 14-44. (PR-33; CPA-532)

OFFICE OF DEFENSE TRANSPORTATION

Freight Loadings: Carload freight loading requirements for specified commodities under provisions of orders ODT-18A include the following: Bolts, nuts, rivets, screws, washers and nails in packages in closed freight cars, not less than 60,000 lb. (ODT-18A-1; ODT-1076)

WAR ASSETS ADMINISTRATION

Strategic Materials: New procedures for stockpiling strategic materials have been issued by WAA, providing for transfer to the government stockpile of all government-owned surplus materials determined by the Army and Navy Munitions Board to have strategic possibilities and which may be needed for the common defense. New features of this regulation as compared with the previous SPA Reg. 17 are: (1) No distinction is made as to category, namely, minerals and metals and strategic materials; (2) no minimum pricing requirement in disposition of strategic materials to satisfy civilian deficiencies; (3) Army and Navy Munitions Board may acquire government-owned surplus strategic materials without an actual cash outlay except that they may not in any fiscal year exceed in dollar value in acquisition from surplus stocks an amount which in turn exceeds the actual congressional appropriation for such fiscal year; (4) a central control is established by having RFC review reports from all owning agencies of surplus strategic materials to determine whether disposition will be for the stockpile, sale to meet civilian deficiencies as determined by CPA, or declared surplus. The new regulation also provides that the CPA estimate current requirements of industry. This will be accomplished on a yearly basis instead of six months' supply. Sales to satisfy civilian deficiencies as found by CPA will continue to take precedence over transfer to stockpile. (Reg. No. 17; WAA-528)

OFFICE OF INTERNATIONAL TRADE

Export Licenses: OIT has added 32 additional building materials and equipment to the list of products which require individual licenses for shipment abroad. Products added include: Woven-wire screen cloth; heating system controls; circular saws; steel band, pit drag and mill saws; crosscut and hand saws; augers and bits; shovels, spades, scoops and drainage tools; ballast forks, stone forks and trowels; guttering, metal roofing sheets, roofing steel; brass and bronze window strips; motors, 1/3 horsepower and under; temperature controllers and parts; wheelbarrows; planers, matches, jointers and molders; concrete block and bending machines; and the following types of machinery: Sawmill, veneer, woodworking and brickmaking. (OIT-84)

OIT To Grant Exporters Additional Licenses

Effective immediately, exporters of building materials will be permitted to submit more than one application for an export license for Group K countries during a calendar quarter, if shipments are to be made from more than one port of exit, or if unusual circumstances exist, the Office of International Trade has announced, provided the total amount of materials covered by all applications from a single exporter do not exceed the amount which would have been covered by one application. Holders of licenses may have them replaced by two or more licenses for use at different ports.

Windows of Washington

Recall of Donald M. Nelson to lay groundwork for rapid mobilization of industry in event of another war comes at a time when hopes of achieving a permanent peace are sinking. Forty-four per cent of federal budget earmarked for military use

RECALL to Washington of Donald M. Nelson to lay the groundwork for rapid mobilization of industry in case of another war comes at a time when sentiment in many key places in the government is undergoing an important change.

Heretofore, emphasis has been on bending every effort to secure a permanent peace. Of late there has been increasing pessimism as to the possibility of achieving this goal. There is increasing fear that the United States may be drifting close to another war.

In view of this situation, Mr. Nelson's new assignment is of the utmost significance both to the country and to the country's war industries. The former chairman of the War Production Board, who generally is given credit for having played the leading part in mobilizing industry in World War II, has been charged with the responsibility for doing the paper work in preparation for the next emergency. His job breaks down into two main parts:

1—A survey of the materiel of all types, and in quantities needed, that would be required for another war as indicated in the light of today's experience and knowledge. Over against this is to be compiled a list of all the country's industrial facilities that can be enlisted in the manufacture of such materiel. In this study, Mr. Nelson will work in close contact with representatives of the Army and Navy and of the various industries involved.

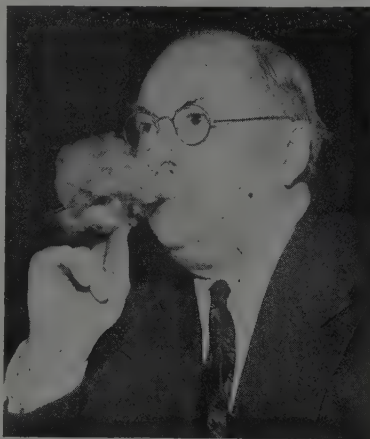
Production Board To Be Planned

2—The laying down of a blueprint for a new War Production Board—providing for the priorities and other machinery that will be needed. This blueprint further will list all jobs to be done, so that the needed key men can be drafted from industry without delay—if and when the call comes—and handed a complete assignment when they arrive in Washington. The idea is through this advance planning to get the next War Production Board organized and functioning without the faltering incident to our entering upon World Wars I and II.

Mr. Nelson, now busy arranging his affairs in California in preparation for a rather protracted stay in Washington, is expected back in the capital city almost any day. His headquarters will be in Rooms 1228-30 Federal Reserve Building—on Constitution avenue across from the Navy Building. His present plan is to

have only a small personal staff, and to have most of the detailed work done by Army and Navy personnel under his direction. He will work closely with the Industrial College of the Armed Forces and the Army and Navy Munitions Board.

Washington observers believe that if we are due to get into another war we are in much better shape to fight now than might be the case at some date in the future that might be preferred by poten-



DONALD M. NELSON

tial enemies. Perhaps a rather general impression that we destroyed our war potential as rapidly as possible after V-J Day resulted from many gloomy statements by the military in their effort to get sympathetic treatment from Congress. Certainly this impression is not justified.

Despite tremendous relaxation after V-E Day and V-J Day, our military potential is gratifyingly high. Although Congress did not legislate universal military training, the Selective Service Act will continue operative until March 31, 1947. The rate at which the armed personnel is being scaled down has been sharply reduced. We will have a combat army of 1,070,000 officers and men and a Navy of 710,000 officers and men on July 1, 1947. These are nuclei which, considering the vast reservoirs of veterans, could be built up rapidly to our maximum strength.

To arm our future enlarged army and navy we have in storage large reserves of guns, ammunition, tanks, planes, communication equipment and other materiel,

and vast numbers of merchant and naval vessels which merely will require de-preservation and operating crews. We continue to manufacture atomic bombs, and we already have made great progress since the last war with such new weapons as guided missiles, robot planes, much more efficient signal and control equipment, bacterial warfare, improved underwater devices, etc.

Another measure of our present military potential is the fact that 44 per cent of the federal budget now is earmarked strictly for military purposes. Of the \$41 billion to be spent for all federal purposes in the fiscal year ending June 30, 1947, the Army and Navy will spend \$18 billion.

Another measure of our present military potential is the percentage of this \$18 billion to be spent on research and development work. Unfortunately no overall figures have been released.

For example, Army Ordnance has research and development contracts with more than 600 manufacturing establishments and with 80 research institutions. These contracts involve such projects as the development of lighter but stronger steels for armor plate and guns, the use of the extrusion process in forming steel, and the development of numerous projects associated with new and improved weapons.

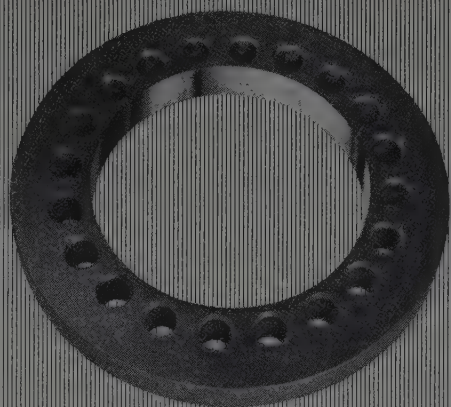
"We keep on scanning industry," an Ordnance spokesman told STEEL, "and we let contracts to a large extent with a view to benefiting from all the help that industry can give us. We are trying not to miss any bets."

The largest single program is that of the Army Air Forces which has let developmental contracts involving hundreds of millions of dollars. Other Army units—Quartermaster Corps, Chemical Warfare Service, Engineers, Signal Corps and Transportation Corps—have similar programs in operation.

As to the Navy, a special mandate from the Congress has resulted in replacement of the former Office of Research and Inventions by the new Office of Naval Research. The latter now has in operation 177 contracts involving fundamental research and this number is being increased right along.

Frowns on New Tax Policies

Under conservative Secretary John W. Snyder, the Treasury Department will no longer serve as a sounding board for New Deal tax proposals. In administration councils the Treasury Department now takes the view that the present fight against inflation does not warrant adop-



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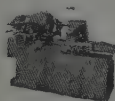
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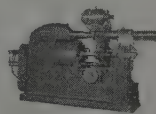
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tion of new tax policies. For instance the most effective guard against inflation would be a special tax on consumers—but Treasury fears that once such a tax system were adopted it would be continued long after its justification had disappeared. The real cure for inflationary trends, Treasury believes, is expanded production of consumer goods. Present Treasury recommendations call for:

1—Reduction in government expenditures wherever possible, but after careful consideration for the reason that unwise economies would invite harmful results. Treasury is against any economies that would weaken our military potential.

2—Retention of present interest rates is desirable on the theory that a tight money policy would stimulate inflation and threaten stability of the government bond market. The maintenance of stability, Treasury feels, results in a degree of business confidence which is of tremendous value in achieving and maintaining full production—and thus shortening the period during which inflation will continue to threaten.

3—There should be no increase in taxes in the period immediately ahead, for the reason that the inflationary pressures will not be great enough nor sufficiently long-lasting to justify an added load on the American people. On the other hand, the size of the current budget does not warrant any reduction in the current tax load.

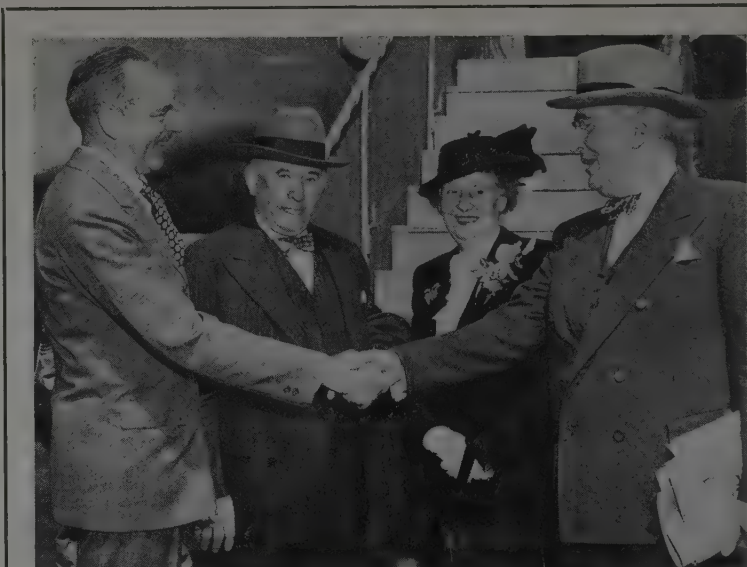
Navy Ships To Be Redesigned

According to naval officers just returned from the atomic bomb tests at Bikini Atoll, a big job of redesigning naval vessels is ahead. So far major attention has gone to the ships themselves, and there are to be substantial changes in design of hulls, masts, structural members, armor, etc. Preliminary data, according to Vice Adm. W. H. P. Blandy, indicates also much redesign of valves, pumps, instruments, fittings and many other accessories which proved "brittle" under the shocks of atomic bomb attacks. In many cases a new study to determine the best materials of construction of such accessory apparatus will be launched. Manufacturers of such equipment and parts for the Navy probably will not get the new "atomic age" specifications before the latter part of 1947 and possibly not until 1948.

FTC Ruling Questioned

Some Washington specialists in anti-trust law wonder whether the Federal Trade Commission overreached itself when it recently opposed the request of the United States Steel Corp. for clarification that would permit its subsidiaries to meet delivered prices of competitors.

If the commission's position is upheld



PEACE CONFERENCE BOUND: Acting Secretary of State Dean Acheson bids farewell to Sen. Arthur Vandenberg as he left Washington Airport for the Paris Peace Conference. Left to right are: Dean Acheson, Sen. Alben Barkley, who was enroute to Switzerland via Paris to attend a meeting of the executive committee of the Inter-Parliamentary Union; Mrs. Vandenberg, who accompanied her husband; and Senator Vandenberg. NEA photo

by the courts, it would be legal to sell steel only on the fob mill basis plus the actual cost of transportation to points of consumption. Such a situation would cause a great uproar among steel buyers for, carried out to its ultimate effect, this policy would force a buyer to obtain his steel from the nearest mill—unless he was willing to pay a higher price to a less favorably located mill. It would destroy the time-honored method of equalizing freights under which the consumer can buy from any one of a number of producers at the same delivered price.

The tortured reasoning under which the commission has evolved some of its orders has been causing distress within the commission itself. This is attested by a sharp dissent by Commissioner Lowell B. Mason to the commission's order to the Standard Oil Co. of Indiana to desist from giving a special concession of 1½ cents a gallon to four large gasoline customers in Detroit. The commission majority held this concession is discriminatory against 358 smaller distributors in the Detroit area. It refused to consider Standard Oil's contention that denial of the 1½ cent concession would result in loss of the business to competitors.

Commissioner Mason accused the commission in this case as being squarely in opposition to Section 2 (b) of the Robinson-Patman Act which gives a supplier the right to meet a competitor's price. He

found his fellow commissioners at fault in writing into the administration of the act a "social economic ideology of determining price by use" which was definitely and specifically rejected by Congress. Mr. Mason found no basis for the argument that the four large Detroit buyers should pay the same price as smaller buyers because they resold the gasoline partly at wholesale and partly at retail. An attempt to force a wholesaler-retailer to pay two different prices for gasoline, he declared—one price on the gasoline sold at retail and one price on that sold at wholesale—is contrary to the free enterprise system.

Wartime Custom Prevails

Capital city observers who have nothing better to do note that the wartime custom of keeping the flag flying over the White House when the President is away still is the rule. This custom was started for security reasons when President Roosevelt made his frequent excursions to war plants and to foreign destinations. That the flag is flying merrily with President Truman vacationing in Atlantic waters, White House attendants say, is merely another indication that the war is not legally ended. The old custom of taking down the flag when the President is away will be resumed as of the date when the war is declared ended.

Canada's Industrial Reconversion Is Three-Fourths Accomplished

Completion of reconversion is expected by next spring. Modernization and expansion programs promise maintenance of a high level of employment and income. Delays in obtaining machinery and equipment retard resumption of peacetime production

CANADA'S industrial reconversion from wartime to peacetime production is three-fourths accomplished now and is expected to be completed by the spring of 1947. By the end of 1946, the reconversion should be within 10 per cent of completion.

In announcing this progress, Canada's Economic Research Branch of the Department of Reconstruction and Supply said that the technical reconversion has been characterized by speed and comparatively little dislocation and that during the first postwar year manufacturing industries have shown a vigor not unlike that demonstrated during the war.

As an evidence of this vigor, the Economic Research Branch points to Canadian industry's programs of modernization and expansion designed to increase efficiency, to serve better the domestic consumer and to strengthen Canada's position in international trade. The large investment program planned by industry holds promise, the ERB said, of maintaining a high level of employment and income for the country in both 1946 and 1947, unless seriously interfered with by strikes and materials shortages.

Unemployment Kept at Low Level

Despite the magnitude of the manpower shift between June 1, 1945, and June 1, 1946, when approximately 620,000 servicemen had been discharged and 720,000 persons released from war work, the number of unemployed was kept surprisingly low. It never reached more than about 270,000 out of a total working force of close to 4.8 million. The peak level of transitional unemployment was reached in March, and by that month, as the forces of expansion grew, unemployment had declined by 100,000.

From a survey of 643 plants, the Economic Research Branch determined that as a result of modernization and expansion the firms covered expected not only to maintain their employment but to increase it 3.4 per cent over the May 1, 1946, level. A little over half of the total increase was reported by plants which expected to complete their modernization and expansion programs by the end of 1946. However, present indications are that this increase will not be

realized fully because of the retarding effects of labor unrest and materials shortages.

The survey showed that three-fifths of the plants engaged in reconversion activities were being retarded by various shortages, the most important of these being delays in obtaining machinery and other equipment. About half of the reporting plants had postwar plans for modernizing or expanding their facilities. Modernization programs were being undertaken in two-fifths of the plants and expansion programs in one-third of the plants.

Among the major industrial groups the number of plants requiring reconversion was proportionately greatest in the durable consumers' goods groups, such as automobiles, radios, washing machines, etc.

The incidence of modernization and expansion was highest in the durable consumers' goods group, mainly due to the need for those industries to introduce

new technical devices and production methods which they were unable to adopt during the war. Most of the industries in the producers' goods and basic materials groups expanded greatly during the war years. Their main problem now, the Economic Research Branch said, is the consolidation of their wartime gains.

U. S. and English Packaging Groups To Exchange Data

The Packaging Institute Inc., New York, and the Printing & Allied Trades Research Association, London, England, have made arrangements to exchange technical research data.

The British group through its packaging division maintains laboratories and library facilities to advance Britain's technical studies in all phases of metal, paper, glass and synthetic materials. These studies soon will be expanded through a recent grant from the British government.

The Packaging Institute, comprised of about 400 United States and Canadian firms manufacturing packaging materials and machinery and a large number of leading package users, does not maintain its own laboratory but conducts research through committees and advisory boards of both producers and users.

Future bulletins and publications of each group will be distributed among the two memberships.



AGRICULTURAL MISSIONARIES: Members of the Church of the Brethren who will take American farming methods and mechanized farming equipment to famine-stricken China are being instructed in the operation of a hydraulically-controlled weeder by Edward E. Range, in the tractor seat, an instructor at the Harry Ferguson Inc. educational farm in Detroit.

NEA photo

British Iron and Steel Prices Rise

Increases necessitated by advancing costs of production and transportation. Additional criticism of nationalization of Britain's steel industry comes from consumers and producers of tin plate. Shipbuilders at high rate of activity

By J. A. HORTON
Editorial Correspondent, STEEL

BIRMINGHAM, ENG.

UNDER A NEW order issued by the Ministry of Supply maximum prices of the main qualities of pig iron have been increased by 4s 6d to 6s 6d per ton (90c to \$1.30), and of heavy steel by 5s (\$1.00) a ton. Prices of more finished products have been, where necessary, increased by amounts which reflect the increases in pig iron and semifinished steel as well as the advance in direct processing and delivery costs.

These adjustments follow an advance in coke prices only a few weeks ago to cover the extra cost of railroad transport. Business is not likely to suffer because of these changes. Iron and steel is urgently needed for the domestic market and for export although the allocations for the latter have been severely cut for the rest of this year.

New prices of a selected number of staple products follow:

Pig iron, 2.5 to 3.00% Si, dd. Middlesbrough, £8 9s 3d (\$34.02).

Pig iron, basic, all districts, £8 (\$32.16).

Pig iron, hematite, dd. Scotland, N.E. & W. Coasts, £8 19s (\$35.93).

Ferromanganese, standard grades, 78% Mn, £19 10s (\$78.40).

Billets, basic soft, 100-ton lots, £12 17s 6d (\$51.75).

Structural shapes, northern area and Scotland, £16 9s 6d (\$66.22).

Boiler plates, £18 2s (\$72.76).

Merchant bars, £18 8s (\$73.96).

Galvanized corrugated sheets, 17/20 gage, £29 1s (\$116.78).

Hard drawn wire, 6/8 gage, £24 (\$93.48).

Rails, heavy, 60 lb & over, 500-ton lots, £15 12s (\$62.70).

Figures released recently show the extent to which Britain imported ore and metal during the war and draw a vivid picture of the extent to which the war machine was kept going despite all the

difficulties of blackout, bombing, shipping under perpetual enemy attack and ports under enemy bombardment. The dominions rallied to the help of the mother country, and the United States, under lend-lease made a notable contribution. Semifinished steel in the form of billets, blooms and slabs totaled 1,254,258 tons in 1940, increased to 1,362,295 tons in 1941. At that time Britain was receiving substantial tonnages from Australia, Canada, Belgium, Luxemburg and France. In the years that followed, the European sources were of course cut off, and in 1944 of the 693,533 tons brought to Britain 691,122 tons came from the U. S. The same applies to sheet bars and whereas in 1940 Britain bought 262,038 tons, in 1944 she purchased only 1705 tons, all of which came from America. In 1940, 1941 and 1942 basic pig iron was bought on a large scale, totaling for the three years 458,687 tons, 621,038 tons and 299,014 tons, respectively. In the first two years the tonnage was shared almost equally between India and the U. S., but by 1944 India was supplying 174,672 tons, and America, 45,224 tons. On a smaller scale many other products such as sheets, strip, plates, rods, wire, tubes and angles were also bought.

Nationalization Criticized

More criticism of the government's proposals to nationalize the industry has come from consumers and producers in the tin plate industry. Sir Robert Barlow, chairman of the leading consuming concern, the Metal Box Co., has stated that the uncertainty was causing delay in the construction of new strip mills. E. H. Leaver, chairman of the biggest producing interest in South Wales, said plans for erection of the new mills were complex and delicately balanced and the government's decision threatened the foundations on which they were built. His company, Richard Thomas & Baldwins, was, however, endeavoring to start up as many old type tin plate mills as possible, but its restoration to the manufacture of tin plates and sheets was a slow process largely governed by the difficulty of obtaining necessary labor. This difficulty was accentuated by the reluctance of some employees to re-enter an occupation they felt had a limited future.

Tin plate exports from Welsh ports during the four weeks ended July 14 amounted to 4956 tons. A steelworks strike in the western area of South Wales which has been going on since July 26 has caused further delays in delivery.

United Kingdom's Iron and Steel Output In July Lower than Second Quarter Rate

PRODUCTION of steel ingots and castings and pig iron in the United Kingdom in July, 1946, was somewhat higher than in the corresponding month last year but was under the rate prevailing in the second quarter of 1946.

Steel ingot and casting output in July of this year was at an annual rate of 11,759,000 tons, compared with 11,118,000

tons in July, 1945, and a rate of 13,111,000 tons in the second quarter of 1946. Pig iron production in July, 1946, was at an annual rate of 7,645,000 tons, compared with 7,010,000 tons in July, 1945, and 7,827,000 tons in the second quarter of 1946.

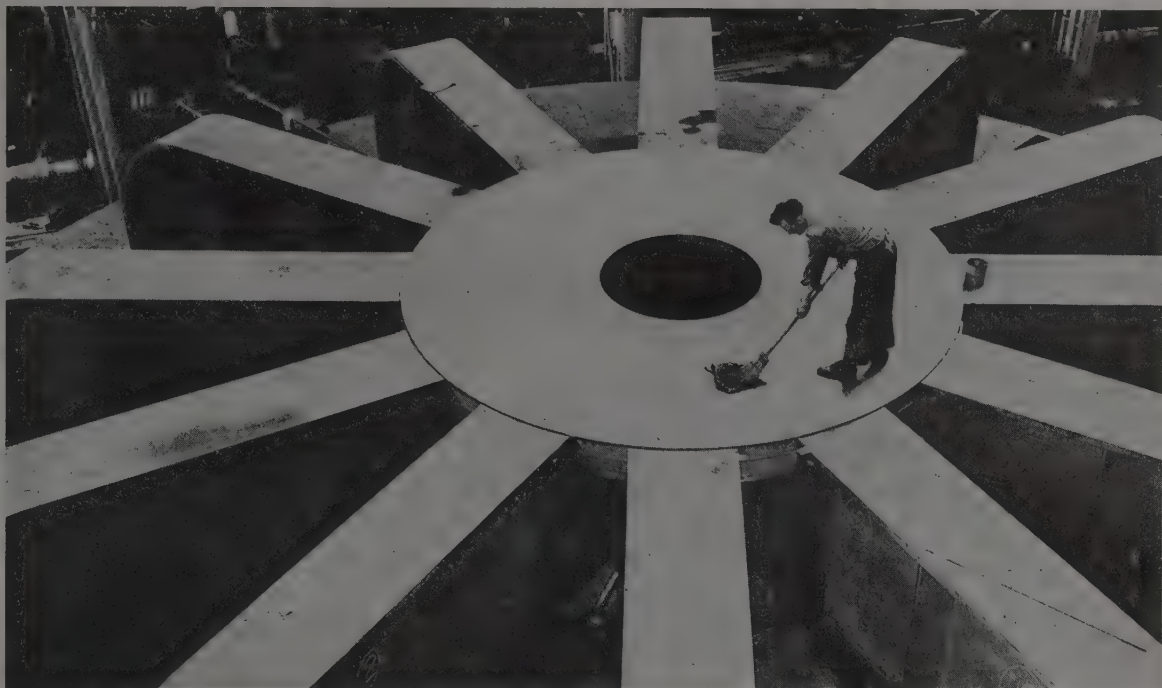
Production details are shown in the following tables:

Steel Ingots & Castings
(in tons)

	1946		1945	
	Weekly Average	Annual Rate	Weekly Average	Annual Rate
1st Quarter	242,600	12,617,000	233,200	12,126,000
2nd Quarter	252,100	13,111,000	227,200	11,814,000
July	226,000	11,759,000	213,800	11,118,000

Pig Iron
(in tons)

	1946		1945	
	Weekly Average	Annual Rate	Weekly Average	Annual Rate
1st Quarter	145,500	7,566,000	134,500	6,992,000
2nd Quarter	150,500	7,827,000	132,600	6,894,000
July	147,000	7,645,000	134,800	7,010,000



POWER FOR RUSSIA: Dwarfed by the size of this hydroelectric generator, a worker at General Electric Co., Schenectady, N. Y., is shown polishing the last of

three which have been built for Russia's famed Dnieper Dam. The largest ever built, the generator weighs more than 2,250,000 pounds. NEA photo

Adjustment of Wages in France Generally Accepted as Satisfactory

Effect of higher rates on cost of living is awaited. August is quiet month industrially as most steel processing works close while workers take two-week vacations. Limited supplies of coal and coke hold French steel production back

PARIS
THE PROBLEM of wages in France has now been settled by the government in a manner which is generally accepted as satisfactory. It remains to be seen what will be the effect of higher wages on the cost of living. The new level of wages would be of little use if prices were to rise to any considerable extent. The present minister of supply is doing all he can to bring about a lowering of prices of essential goods and to stop the ill effects of the black market, and it is thought that he may succeed as the harvest is very promising.

Coal, iron and steel production are showing little change. During August most of the steel processing works close down for a fortnight to allow workers to have two-week paid holidays; the month is therefore essentially a quiet one. The iron and steelworks are abundantly sup-

plied with orders from every kind of processing works. Rolling mills are working to capacity and there is no need to solicit supplementary orders to enable a full program to be established as was the case often before the war. Actually there is a greater volume of demand than can be met. Deliveries extend to six to eight months for structurals and merchant bars, and to twelve months for plates and sheets. Some contracts, however, enjoy a priority, in particular those for the coal mines, and those covering equipment for the development of electric power.

Despite the considerable requirements of industry, steel output shows little signs of increasing because it is conditioned by available coal and coke supplies. Only one blast furnace at a time is being blown in in any works, and a second one only if coke supplies are sufficient to justify taking this step. There is no lack of iron ore

or of scrap; in fact, stocks are abundant.

Coal thus remains the greatest obstacle to the expansion of steel output. Every means is employed to stimulate coal production or to find substitutes for its use. To attain this end, a vast program is being followed to intensify hydroelectric power. On the river Rhone a large dam, 330 feet high is expected to be terminated in 1947-48; it is planned to yield 450,000 kw. Another dam will be constructed on the river Isere. The mountain range of the Massif Central will also be put into use, and the "Bord" dam will soon be started on the river Dordogne; another on the same river but lower down is under way, and further ones are planned or under construction on the river Truyere.

American methods of construction are being used in the building of these dams, and schedules are being made to cover the purchase of the necessary materials and plant. These include Ingersoll perforators, Chicago Pneumatic and Sullivan equipment, Corway mucking machines from Chicago, cement guns from Pressweld of Pittsburgh, etc. Speed of realization is essential and the various engineering and purchasing missions that have visited the United States from France have been convinced of the efficacy and high efficiency of the plant and equipment manufactured in the United States.

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Automotive industry probably will lose money on every car built in 1946 even though assembly rates now exceed what once was considered the break-even rate. Little chance seen for betterment until government controls on suppliers are removed

DETROIT

ANOMALIES like scarcity amid plenty, staggering corporate losses alongside record profits, shortages in the face of peak production and discontent in the most prosperous nation in the world are routine on the American scene today. To foreigners, as to many in the U. S., they just don't add up, yet there they are.

Consider just one strange phase, that of steady operating losses in certain companies concurrent with peak profits in others. The automotive industry, for example, continues to lose money on every car built and probably will continue to do so through the balance of this year, even though assembly rates now are well beyond what was once considered the break-even rate. The steel industry, operating steadily in the 90 per cent area, is doing little better than breaking even, is asking for and probably will get additional price relief. The railroads are running so far in the red they are suspending dividend payments and talking of canceling ambitious programs of rebuilding and re-equipment.

In sharp contrast to the motors, steels and rails are current financial reports of the large mercantile establishments, mail order houses, grocery chains and rubber companies, to name only a few. Thus, Sears Roebuck delineates sales of \$639 million in 24 weeks prior to July 16, an increase of 52 per cent over a year ago, with profits up from \$14 million to \$38 million net after taxes. Goodyear Tire & Rubber shows first-half consolidated net earnings, after providing a \$4 million reserve for foreign investments, of better than \$15 million, the equivalent of \$6.59 per share of common stock, against \$2.90 per share earned in the same period a year ago.

Goodyear's consolidated net sales for the six months was nearly \$283 million, compared with \$408 million a year ago and \$153 million in the first half of 1941. Tire production is at an all-time high rate of around 86 million annually, and next year's demand is estimated at 83 million. Yet there are new rumblings of labor discontent from Akron which may set the industry into a tailspin. And just try to buy a new tire at retail today.

Obviously the rubber companies are enjoying a market which requires little or no sales effort. There is no cut-throat

price competition of prewar days. Tire prices are in many cases double what they were in 1941. The price of synthetic rubber is set by government fiat at 18 cents a pound, any production costs in excess of this amount being absorbed by the government.

The automotive industry is perhaps peculiar in that it is at the mercy of a labyrinthine network of suppliers which have been beset by the worst wage-price-strike infection imaginable. Result has been that where in normal times the

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Tabulated by Ward's Automotive Reports

January	121,861	524,037
February	83,841	509,332
March	140,777	533,878
April	248,318	489,856
May	247,620	545,321
June	214,511*	646,278
July	334,500*	468,897
August	360,500*	164,793

Estimates for week ended:

Aug. 10	77,825*	41,795
Aug. 17	88,990*	45,550
Aug. 24	91,620*	45,525
Aug. 31	70,000*	39,965

*Preliminary.

ready availability of co-operative, and at times even submissive, group of vendors was an important factor in the good profit performance of the automotive industry, today the situation is just the reverse. Until all government controls, except on taxes, are dropped from this segment of U. S. manufacturers there is little chance of any betterment. Union leaders, incidentally, might well ponder the perilous position in which their memberships are placed as long as their employers continue to operate at a loss. Rather than scream at profits which are not there, they might profitably raise their public voice—and it is no faint one—in the effort to make profits possible.

Auto Sales Increasing

For the record, it might be mentioned that factory sales of passenger cars for

the first seven months of the year were 30.7 per cent of sales recorded the same period of 1941, totaling 849,804. July shipments were 60.9 per cent of the 1941 figure, and August will top the same month five years ago, but only because of the model changeover in the latter period. Truck sales compared more favorably in the first seven months, being 63.7 per cent of the 1941 figure. Total for all types of vehicles was 37.1 per cent of the 1941 level.

Foreign Market Cultivated

An interesting postscript to these figures is the extent of shipments to foreign markets. In the seven months under consideration 51,462 passenger cars and 83,059 trucks and commercial cars were moved out of the country, representing 6 per cent and 24 per cent, respectively, of total factory sales. These figures are close to prewar averages—7 per cent and 21 per cent respectively—for passenger car and truck exports, indicating special efforts are being made to hold on to this country's top position in foreign automotive markets.

Foreign competition for this big chunk of U. S. trade, by the way, is being sharpened to a keen edge. Britain, particularly, is planning the export of an unusually large proportion of her motor car production, in fact, has already started such shipments. Other countries have similar programs in the formative stage. Australia, for example, is stepping up production facilities for car production, some of which will be directed by American companies.

General Motors Holdens Ltd. in Melbourne is drawing up plans and buying production equipment for additional plants to build a light 6-cylinder model, along the lines of the Chevrolet. Hand-built versions are being put together in Detroit now for subsequent testing and transfer to the Australian operation.

Defiance, O., Gets Foundry

Defiance, O., has been selected as the site of the new gray iron foundry to be erected by the Central Foundry Division of General Motors, winning out over Tiffin, O., by a margin of 3126 to 2625 in applicants for prospective employment. Survey work on the plant site has begun and it is hoped that ground can be broken in 60 days. The larger number of applicants in Defiance was not the sole factor in deciding to locate the plant there. Consideration was given to which area could best supply the necessary 2000 working people without disturbing community life in general, other



LAND CRUISER: This luxurious 4-room, 30-foot long air-conditioned land yacht was built by Linn Truck & Coach Corp. for Dr. H. J. Secley of Dumont, N. J., right. At left is A. R. Perkins, president of the Linn firm. The 7-ton vehicle is powered by a 6-cylinder 125 horsepower Hercules engine and is capable of speeds up to 75 mph. It was built at a cost of \$20,000. NEA photo

manufacturers and local transportation.

Dodge Announces New Trucks

Three new heavy-duty trucks, each available in ten different models, have been announced by the Dodge truck division. They are to be built in 60 gross vehicle weight classifications up to 23,000 pounds and in tractor-trailer ratings up to 37,000 pounds. Engines powering the new heavy-duty units are based on designs developed for trucks built during the war for service on the Burma road, and embody such features as chrome-nickel-molybdenum iron cylinder blocks, aluminum alloy pistons with steel struts to control skirt expansion, four piston rings with the top one chrome plated, seven crankshaft bearings of the steel-back, copper-lead and lead-tin multiple layer type, induction hardened crankshaft journals, sodium cooled exhaust valves stellite-faced and seating in stellite inserts, three-piece slip-joint exhaust manifold, multiple-valve fuel pump, etc.

Union Trouble Forestalled

The Ford industrial relations department has forestalled probable trouble from the UAW-CIO in its campaign to obtain increased vacation payments for veterans, by relaxing vacation eligibility rules to grant credit for prewar service to those who were laid off at Ford plants when civilian production was halted. Indicated increase in vacation benefits is around \$300,000.

The union's current campaign is directed chiefly at General Motors, and a test suit has been filed with a federal district court in behalf of a GM employee. Several weeks ago a group of about 100 veterans carried out a few "squads right"

and "squads left" in front of the GM plants in Pontiac, carrying placards demanding extra vacation pay, with the result that a full day's production of 13,000 was lost because of the refusal of workers to go to their jobs while the veterans were "picketing." The stunt had all the earmarks of a carefully engineered publicity move by the union, and was so characterized by H. W. Anderson of General Motors. However, the union immediately disclaimed any responsibility, saying it had advised the veterans against the demonstration and ignoring the fact that in original contract negotiations it had rejected a plan whereby such veterans would have received the vacation pay they sought.

Ford Awards Plant Contract

Ford has announced award of contract to F. H. McGraw & Co. for purchase and installation of new production equipment in an assembly plant being built at St. Louis. The contract totals over \$3 million and marks the first time Ford has placed a single order for purchase and installation of all equipment in an assembly plant with an outside interest. Most of the work will involve spray booths, welding equipment, steam ovens, infra-red drying ovens and accessory equipment. The plant is designed to assemble 500 Ford and Mercury passenger cars and Ford trucks daily; it will employ 3000.

Packard To Ask Rehearing

Action of the U. S. Circuit Court in Cincinnati in deciding by a vote of two to one that foremen at the Packard Motor Car Co. are in the front line of management in their relations with rank and file workmen but are employees under

the National Labor Relations Act in their relations with management and hence entitled to organize and bargain collectively, was not unexpected in these days of double talk in high places. The Packard management has decided to petition the court for a rehearing and, if denied, will seek to have the issue reviewed by the U. S. Supreme Court.

Dissenting opinion of Judge Simons is worth repeating in part. He stated: "Up to the present case, the labor board had held in a long series of decisions that foremen do not constitute an available unit for collective bargaining. The basis for departure from earlier decisions is that dangers previously apprehended have not materialized. We are concerned, however, with the interpretation of a statute and now the making of a policy. Congress formulates policy and the court's function is to ascertain the congressional purpose from the terms of its enactment. . . ."

Nash Production Delayed

Suppliers' strikes and materials shortages have delayed postwar production at Nash by at least six months, according to estimates of manufacturing officials. Latest suspension has been the company's Ambassador models, occasioned by a shortage of intake manifold castings. Nash produced 61,897 cars from V-J Day through Aug. 21, instead of the planned 108,795. Present assemblies average about 350 a day, compared with a planned output of 800 daily.

Amplex Gets New Equipment

Amplex Division of Chrysler Corp. has installed additional presses and sintering equipment for handling powdered metal parts weighing over 100 lb and as large as 20 in. in diameter. Equipment formerly was limited in general to parts of less than 8 sq. in. of area. Largest cylindrical block of powdered metal made to date weighed 233 lb.

\$715 Million Road Program

Despite shortages of material, labor and equipment, postwar highway construction to repair the country's roads and to build new ones now totals \$400 million, according to Charles M. Upham, engineer-director, American Road Builders' Association.

Estimated state and federal-aid programs to be placed under construction this year will bring the total to \$715 million, which tops the government's estimate of \$500 million of road building in 1946, and with some of the bottlenecks removed this year, a marked increase in highway construction can be safely predicted for 1947, Mr. Upham said.

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Employment Shows Steady Rise Despite Reconversion Problems

Needs for workers in San Francisco area have not been filled and are not likely to be soon. Employment of additional numbers of people to overcome loss in production resulting from lack of worker efficiency helps put heavy drain on labor pool

SAN FRANCISCO

AFTER slightly more than a year of peacetime production, hampered as it has been by reconversion problems, material shortages, etc., perhaps the most noteworthy industrial trend in the San Francisco area—as well as on the whole West Coast—has been the constant rise in employment.

By this time, forecasters who a year ago were predicting a slump in manpower needs have long since been outcountenanced and all their theories disproved. On the basis of an informal survey of employment conditions in the San Francisco area, it now can be said that employers' needs for workers not only have not been fulfilled, but are not likely to be filled soon.

Demand for manpower varies, of course. Larger firms are in a relatively better position than smaller companies, but manufacturers in general have a greater need than nearly any other type of industry.

A sample poll of companies, designed to provide a cross section of overall labor needs, shows that three-fourths of this section's industries intend to continue recruiting workers. Nearly every company surveyed has a need for skilled men, some in great degree, others to a lesser extent.

Labor Pool Dwindles

Meantime, the available labor pool from which employers can draw men is dwindling steadily. Currently, of those able and willing to work, less than 25,000 are unemployed in San Francisco. About 17,000 of these have applications for jobs on file with the U. S. Employment Service. Actually, however, to say there are 25,000 "unemployed" is a fiction. A large proportion of that number is unemployed only temporarily. What their present status amounts to is that they are seeking to change jobs.

This problem of turnover still is a serious one for many San Francisco firms. It appears to be a natural corollary of the reconversion period. During the past year, thousands of shipyard workers have had to find new jobs, for example. Many of these, when the yards closed, took the first jobs that were offered in other industries. Before long they found that

either the work did not suit them or they did not suit the work. Hence, there began a drifting from job to job. This trend still is continuing and may be a factor for some months yet. Eventually, the bulk of workers will settle down.

Then, too, the same thing is true of veterans, who also are experimenting with newly found trades and skills acquired in the services. Many veterans still are changing jobs with a greater than normal rapidity.

One factor that is having a direct influence on the employment situation is a decline in worker efficiency in terms of production units. In about 70 per cent of the factories surveyed, efficiency was reported to be below normal. Some factories estimated it 65 per cent below prewar standards.

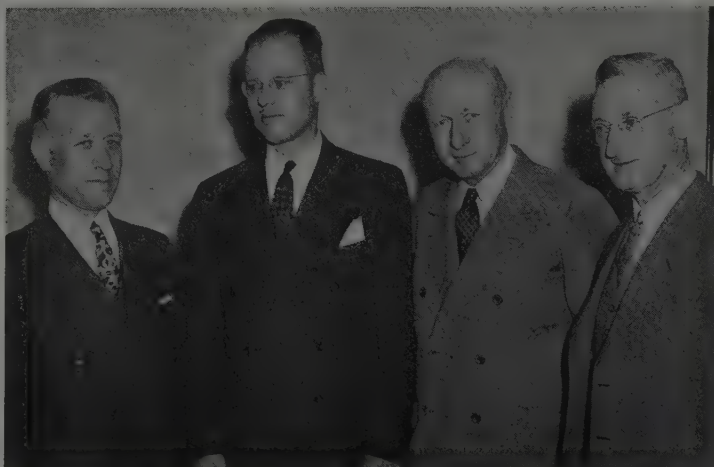
There are a number of reasons for this. Many employers tend to place most of the blame on the workers themselves. Some say less efficiency is a direct reflection of the rise of unionism. Others say it is caused by many workers' atti-

tude of "the world owes me a living." In some places it is attributed to inexperience of workers, and over-classification or upgrading above what is considered normal levels of ability. Some employers believe that worker efficiency will improve when the workers gain experience. Right now, they point out, production has to be sacrificed because so many men are being trained.

One factor which often is overlooked by many employers, however, is that a decline in efficiency is a mechanical rather than a human fault. It is pointed out that most factories came out of the war with machines and equipment in poor condition after six years of hard usage.

Up to now it often has been difficult or impossible to increase, replace or repair equipment because of material and parts shortages. Once the physical side of industry is put into good working order, it is believed there will be a corresponding increase in efficiency.

Meanwhile, employers faced with that condition are on a spot. In order to keep production at an efficient level they have to hire more workers. For instance, it may take ten men to produce 100 units in 1946, whereas in 1939 100 units could be produced by six men. So if production is to be kept at a high level, and thus provide profit margins that only mass production can bring, it is necessary to expand working forces to make up for the loss of efficiency. On the other hand, the more the working



GE OFFICIALS AT HANFORD: Ralph J. Cordiner, left, vice president, General Electric Co., inspects the Hanford Engineering Works at Richland, Wash., management of which was taken over on Sept. 1 by GE. The \$347 million atomic energy project had been operated by E. I. du Pont de Nemours & Co. Other GE officials shown include, left to right: J. F. Gogins, manager, Spokane office; A. S. Moody, commercial vice president; and Clarence Champ, manager, Butte, Mont., office

force is raised, the higher the costs, especially as labor is the major expense in nearly every type of manufacturing enterprise. Naturally, this squeeze can't go on getting tighter and tighter.

Among San Francisco firms in greatest need of workers, especially skilled men, are companies grouped as metal fabricators. The metal trades industry, excluding shipyards, now employs more than 50,000 persons, and the industry expects to add more than 5000 workers by the end of the year.

WAA Reoffers West Coast Steel Tubing Property

Widespread interest in the disposition of a steel tubing plant in Los Angeles, built by the government and now being operated under temporary lease by the Pacific Tube Co., has resulted in the facility being reoffered for sale by the War Assets Administrator. All previous offers to buy the property were rejected by WAA on Aug. 20 when the bids were opened.

The plant is expected to participate in a substantial way in the industrial steel expansion of the West. The site, which includes mineral rights, is located in the recently discovered Vail oil field where some profitable wells have been drilled. The plant and oil and mineral rights in the oil field are being offered separately.

Construction Permits Total \$133 Million in Los Angeles

LOS ANGELES

A total of \$133,142,000 worth of building permits were issued in Los Angeles during the first six months of this year, statistics from federal bureaus disclose.

Comparatively, in New York City there were \$70,265,000 in permits; in Detroit, \$69,183,000; in Chicago, \$68,902,000.

During June, new construction started in Los Angeles amounted to \$19,056,551. In additions, alterations and repairs the total was \$2,433,000 that month.

Los Angeles ranked fifth, however, in the construction of factories, according to permit statistics. In June, papers were issued for \$1,190,000 worth of such industrial building.

Operations To Be Started at Troutdale Aluminum Plant

PORTLAND, OREG.

Operations at the Troutdale aluminum plant are to be started the first week in September by the Reynolds Metals Co. The plant has been closed for about a year.

Sale of Government-Owned Steel To Export Firm Halted by Navy

Delivery of 5000 tons of steel stockpiled at Port Hueneme, Calif., is said to have been stopped because of complaints to Washington that Argentina should not receive scrap that is vitally needed for domestic furnaces

LOS ANGELES

A STOCKPILE of more than 5000 tons of steel lying at Port Hueneme, near Los Angeles, last week was the focal point of a tug-of-war between southern California steel mills, the Navy, various dealers, civilian government agencies and an export firm which would send part of the material to Argentina.

P. W. Keen, executive secretary of the Institute of Scrap Iron & Steel, southern California branch, disclosed that the Navy first declared the tonnage, mostly pontoon parts, to the War Assets Administration as salvage. When it did not sell in that form, it was taken over as scrap by the Navy. It was then offered on bids from local consumers and dealers.

Mr. Keen, as well as mill representatives in the area, pointed out that in the subsequent bidding potential buyers were limited to the OPA ceiling price of \$13.48 a net ton. At the same time a Hollywood export firm, buying for foreign shipment, was able to bid \$1.31 per ton over the OPA price and was awarded the material.

Shortly thereafter, in a sudden reversal of policy, the Navy Bureau of Supply in Washington halted delivery to the export firm. All bids were then ordered destroyed.

Classifies Parts as Salvage

Comdr. J. L. O'Brien of the supply office at Port Hueneme told a STEEL reporter that the Washington bureau made its reversal after noting the sale in an official catalog and based its new finding upon the fact that the steel should be offered as salvage instead of scrap.

An official at the Los Angeles WAA office said that he "had no knowledge" of any offering of the pontoon parts as salvage by that agency.

To both these statements, Los Angeles executives contacted by STEEL took exception. The real cause of the halting of delivery lay in complaints made to Washington to the effect that Argentina should not receive scrap so vitally needed for domestic furnaces, they asserted. In addition they pointed out the inconsistency of one federal agency selling for export while the Civilian Production Authority and other bureaus are currently pushing

the collection of scrap for the benefit of many furnaces already shut down.

One southern California mill representative with an avowed 10 days' supply of scrap on hand declared that the relatively small amount of steel at the port is unimportant in itself.

Boeing Company Develops Huge New Cargo Airplane

SEATTLE

Development of a double-deck, four-engined Stratofreighter, an all cargo airship, has been announced by William M. Allen, president, Boeing Aircraft Co. This plane has been designed to meet demands of an expanded air cargo field through efficient, low cost operation.

The new type is a sister ship of the 80-passenger Stratocruiser, 49 of which are on order for five major air lines. The 67½-ton Stratofreighter will carry a maximum pay load of 41,000 lb at speeds of 300 to 350 mph. It will be powered by four 3500 hp engines. The plane will have a volume nearly twice that of an average box car and its speed will enable it to cross the continent 20 times while the railroad box car is making one trip.

Among outstanding features in the new plane are the cargo compartments, each separately accessible and each equipped for rapid loading and handling. By means of an electric hoist cargo may be lifted from trucks or directly from the ground.

The Boeing-designed altitude conditioning system has been incorporated into the design. This maintains sea level conditions at all altitudes up to 15,000 feet and 6000-foot conditions at 25,000 feet. Advanced heating system and refrigeration are included in the plan.

General Electric turbo-superchargers will be included in the power plant installation, the first installation in a commercial cargo airplane. The turbines assist in attaining decreased operating costs and increased ranges by saving as much as 14 per cent in fuel consumption.

A twin-engined, high wing ship, Boeing 417, has been ordered into production at the company's Wichita, Kans., division. This ship is designed for feeder line service to small communities.

Sheffield Corp. Purchases Tap And Die Firm

Acquisition of Threadwell Tap & Die Co. adds line of small tools to Sheffield's gages and machine tools

AS ANOTHER step in its long term expansion program, Sheffield Corp., Dayton, O., has purchased the plant, equipment and business of Threadwell Tap & Die Co., Greenfield, Mass. According to officials of the Sheffield firm, no changes are contemplated at present in the operations of either plant. However, the acquisition provides for possible future expansion in the tool and die industry.

Threadwell, which was organized more than 40 years ago and is the outgrowth of several small tool companies, produces small perishable tools. In recent years it has been retooled with thread grinding and hardening machinery. None of its products compete with those made by Sheffield, and its line will complement that of Sheffield.

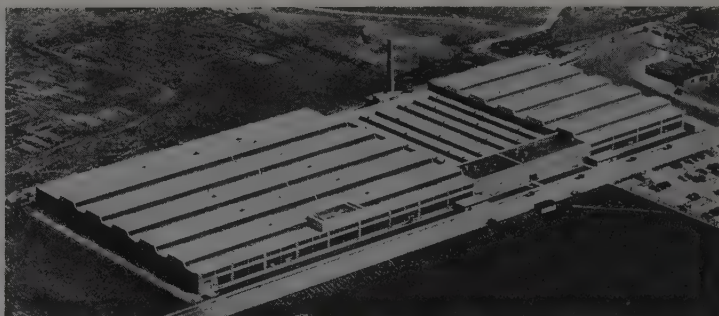
Officers of the Threadwell company include Herbert J. Smith, president; W. B. du Mont, vice president in charge of sales and chairman of the board; and William Scott Keith, secretary-treasurer and principal stockholder, who is understood to be resigning in order that he can devote his full time to other business interests.

The Sheffield Corp., which was organized in 1941 as a result of a merger of a Dayton tool company and the Sheffield Machine & Tool Co., is headed by the following officials: Louis Polk, president; John Bernard, vice president and general manager; C. H. Reynolds, Albert F. Polk and Paul W. Polk, vice presidents; Edward T. Noe Jr., secretary; Oscar A. Ahlers, assistant general manager; and R. F. Whisler, assistant treasurer.

Sheffield has four main divisions manufacturing gages, precision measuring instruments, and machine tools, and providing a contract engineering and manufacturing service.

New Plant To Make Brass Plumbing Products Planned

American Radiator & Standard Sanitary Corp. has announced plans to build a \$3.5 million plant in Richmond, Calif., on the east shore of San Francisco Bay. The new factory will manufacture brass plumbing products and will employ more than 1000.



BUYS WAR PLANT: Chain Belt Co., Milwaukee, has purchased this heavy ordnance plant that had been constructed in 1943 in West Milwaukee for the Defense Plant Corp. The one-story structure containing 317,000 sq ft of floor space is to be used in the manufacture of chain belts and construction machinery

B R I E F S . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Lake Erie Engineering Corp., Buffalo, has acquired Feller Engineering Co., Pittsburgh, manufacturer of hydraulic extrusion presses, and will operate it as Feller Engineering Division with headquarters in the Empire Bldg., Pittsburgh.

Chiksan Co., Brea, Calif., has acquired Well Equipment Mfg. Corp., Houston, Tex., which will be operated as a wholly-owned subsidiary.

Air Materiel Command, Wright Field, O., is compiling a 75,000 word German-English dictionary which is designed to clarify German aeronautical words, phrases, idioms and slang as an aid in understanding captured German documents.

Koppers Co. Inc., Pittsburgh, has purchased for \$1,500,000 from War Assets Administration the plant adjacent to its American Hammered Piston Ring Division plant in Baltimore and will use the facility to increase its capacity for automotive and industrial piston rings.

Pittsburgh Coal Co., operating unit for 18 coal mines of Pittsburgh Consolidation Co. in Pennsylvania, is moving its headquarters from the Oliver building in Pittsburgh to Library, Pa., 14 miles south of Pittsburgh. The change is being made to place executives as near the actual site of operations as is convenient. Pittsburgh Consolidation's headquarters remain in Pittsburgh.

Carnegie-Illinois Steel Corp., Pitts-

burgh, is to manufacture steel for an atom smashing cyclotron magnet to produce five times the maximum energy of any now operating. The cyclotron magnet will be built at the University of Rochester, Rochester, N. Y.

Cooke & Ferguson Ltd., Manchester, England, has been granted manufacturing and distribution rights in the British Isles for the automatic stud welding equipment and flux-filled studs made in this country by Nelson Specialty Welding Equipment Corp., San Leandro, Calif., and Nelson Stud Welding Corp., Lorain, O.

McNally Pittsburg Mfg. Corp., Pittsburg, Kans., has completed a coal preparation plant in Brazil for Companhia Siderurgica Nacional, Rio de Janeiro.

Federal Shipbuilding & Dry Dock Co., Kearny, N. J., subsidiary of United States Steel Corp., has completed a \$250 million emergency warship building program in the Navy's yard at Port Newark, N. J. Federal will continue in charge of the property which will be used as a Navy storage yard and berthing area.

American Locomotive Co., New York, will complete its 75,000th locomotive in September. The company's first locomotive was built at Paterson, N. J., in 1837.

Carboloy Co. Inc., Detroit, has appointed Arthur A. Crafts Co., Inc., Boston, as distributor for Boston, eastern

Massachusetts, southeastern New Hampshire and Maine.

W. B. Connor Engineering Corp., New York, has appointed the following as representatives: O. K. McCullough Co., Kansas City, Mo.; Products Inc., Des Moines, Iowa; and Russell J. Smith, 1601 S. Grand Blvd., St. Louis.

Belfort Corp., Baltimore, plans to establish a branch plant to make kitchen cabinets and other kitchen equipment at Arthurdale, W. Va., where it has acquired three buildings.

Forker Corp., Cleveland, has purchased a factory at 2044 Random Rd., Cleveland, as part of its expansion program.

Federal Telephone & Radio Corp., Nutley, N. J., has completed two laboratory buildings whose walls are made of glass fiber, steel and aluminum as insulation against atmospheric electricity which might interfere with the company's experiments.

Metal Slitters Inc., Baltimore, recently organized, is equipping a two-story building for the slitting of all types of metals. The company plans to add a metal tinning department soon.

Aircraft Division, Weber Showcase & Fixture Co., Los Angeles, has leased the building formerly occupied by Toolcraft Mfg. Co., Los Angeles, for a five-year period and plans to purchase \$50,000 worth of new equipment.

Lukens Steel Co., Coatesville, Pa., has erected a gigantic fluorescent sign measuring 87 feet wide and 34 feet high adjacent to its plant. The sign is made of porcelain enameled pressed steel letters affixed to a steel framework.

A. Finkl & Sons Co., Chicago, has purchased for \$150,000 from Reconstruction Finance Corp. the plant in Chicago which it operated during the war to produce die blocks for the Army Air Forces.

De Laval Aircraft Gas Turbine Division, De Laval Steam Turbine Co., Trenton, N. J., has been awarded what is said to be one of the largest government-sponsored aircraft gas turbine experimental projects in the country.

Warren Belting Co. Inc., Worcester, Mass., recently incorporated, has bought Warren Belting Co., that city, and will continue to make leather belting and specialties.

Bunell Machine & Tool Co., Cleveland,

has established a tool and die engineering service to advise manufacturers on special machine designs.

Cleveland-Cliffs Iron Co., Cleveland, has installed marine radar equipment in its Great Lakes' fleet flagship, *William G. Mather*. The equipment was built by Westinghouse Industrial Electronics Division, Baltimore.

Wheelco Instruments Co., Chicago, has named Farnes & Martig Inc., Portland, Oreg., as sales representative for Oregon.

Hays Corp., Michigan City, Ind., has appointed Illes & Larkin Co., Cleveland, as exclusive representative in the Cleveland area.

Swiss Automatic Co., Marysville, Mich., has moved into its new plant and has added a Brown & Sharpe automatic screw machine department.

Patch & Talmage, Stamford, Conn., recently formed, is offering a complete range of consulting services in the field of powder metallurgy.

Midwestern Metal Corp., Kokomo, Ind., has been formed and will manufacture flat wire. Officers are: Earl Orem, president; Russell Nolan, vice president; and Mrs. Eva Orem, secretary.

H. K. Porter Co. Inc., Pittsburgh, has acquired Brake Equipment & Supply Co., Chicago.

Penflex Sales Co. Division, Pennsylvania Flexible Metallic Tubing Co., Philadelphia, has opened a branch office

at Loew Theater Bldg., Syracuse, N. Y.

Baltimore Castings Corp., Baltimore, has bought from War Assets Administration for \$600,000 the magnesium foundry operated during the war by Maryland Sanitary Mfg. Corp., that city. The company will manufacture soil pipe and fittings.

Bethlehem Steel Co. Gives Contract to Rust Furnace Co.

Bethlehem Steel Co., Bethlehem, Pa., has awarded the Rust Furnace Co., Pittsburgh, a contract to design and construct three continuous triple-fired slab heating furnaces.

Costing more than \$750,000, the furnaces are to be built for the new 66-in. strip mill at Bethlehem's plant at Sparrows Point, Md. The new units will have an effective heating length of 90 ft with an inside width of 24 ft 6 in. Each furnace will have a capacity of 110 tons of steel an hour heated from cold to the rolling temperature of 2250 F.

Westinghouse Enters Bid For Vanport, Pa., Plant

Westinghouse Electric Corp., Pittsburgh, has made a bid for the huge former Curtiss-Wright propeller plant at Vanport, Pa., as a major project in its expansion program. If the bid is approved, Westinghouse plans to manufacture small de-ion circuit breakers at this plant and will probably employ about 2000 people. The plant was built in 1941 at a cost of about \$5 million. It contains 360,000 square feet.



NEWEST IN HOUSING: This new model prefabricated metal house just introduced by the Steelcraft Mfg. Co., Cincinnati, is designed for ease and speed of construction as well as comfortable living space. Called the "Roselawn," this completely insulated house has an all metal structural frame with stuccoed exterior finish and aluminum roof. It can be erected in 125 man hours by inexperienced men. Cost will be between \$3000 and \$5000

Men of Industry



DOUGLAS L. DARNELL

Douglas L. Darnell has been elected vice president in charge of sales, Baker-Raulang Co., Cleveland. Mr. Darnell joined the company's sales staff immediately following World War I, and became sales manager in 1936.



R. K. CLIFFORD

started his career with ACF in 1923 as expeditor in the Material Assembly Division of the purchasing department in New York. In 1935 he transferred to the sales department, and in 1936 was appointed sales agent in the New York sales department.



I. B. ANDERSON

E. J. McGehee has been appointed sales manager, Koppers Co. Inc., Pittsburgh. Mr. McGehee, who is vice president of the company, in his new capacity will co-ordinate Koppers sales activities on a companywide basis. He joined the company in 1934, and was appointed vice president in 1941. Prior to joining Koppers, Mr. McGehee was a production and sales executive of Ayer & Lord Tie Co., which subsequently was purchased and merged with the Koppers Co.

John W. Adelung has been appointed district manager of the White Plains, N. Y., branch, Mack Trucks Inc., New York. He had been New York and New England regional director of the Office of Defense Transportation. Dwight R. Collin has been appointed personnel director, Mack Mfg. Co., subsidiary of Mack Trucks Inc. Since 1935, Mr. Collin had been with the New York law firm of Chadbourne, Wallace, Parke & White-side.

L. T. Wright has been appointed sales manager, Bunell Machine & Tool Co., Cleveland. Mr. Wright is an engineer, and a member of American Society of Tool Engineers, and American Institute of Electrical Engineers.

R. S. Slater has been appointed manager of tank car sales, American Car & Foundry Co., New York. He will be in charge of sales of tank cars, storage tanks and pressure vessels. Mr. Slater

D. A. Williams will retire at the close of the present year as president, Continental Steel Corp., Kokomo, Ind. On Jan. 1, Mr. Williams will become chairman of the board of directors, an office which has been vacant since the death of J. E. Frederick. R. K. Clifford has been chosen to succeed Mr. Williams as president of the corporation. Mr. Williams became vice president in 1927 of the then newly formed Continental Steel Corp. He has been president of the organization since 1931. Mr. Clifford was named vice president in charge of operations of Continental in 1939, director in 1941, and general manager in 1944.

August A. Bolik, for the last 20 years district manager of the Cincinnati and Dayton, O., sales offices of E. W. Bliss Co., Brooklyn, N. Y., has resigned to take charge of the Dayton office of Henry F. Smith & Son, Cincinnati, exclusive sales agents for Federal Machine & Welder Co., Warren, O., and subsidiaries, Warren City Mfg. Co., Warren, and Sommer & Adams Co., Cleveland.

Ray D. Cunningham has been appointed director of sales, Nox-Rust Chemical Corp., Chicago. He had been general sales manager, Wolf's Head Oil Refining Co., Oil City, Pa. During the war years, he was manager of the rust preventive and protective coating department, Kendall Refining Co., Bradford, Pa. W. F. Costello Jr. has been

named eastern sales manager for government and marine sales for the Nox-Rust corporation. Mr. Costello had been manager of sales and technical services, Eastern Division, Inter-Coastal Paint Corp., East St. Louis, Ill.

I. B. Anderson has been appointed manager, Stainless Steel Division, Jessop Steel Co., Washington, Pa. Mr. Anderson has been associated with the steel industry for 24 years. He joined Jessop in 1945. Prior to that, he was with Carnegie-Illinois Steel Corp., Pittsburgh.

John O. Forster has been appointed chief engineer, Aircraft Screw Products Co. Inc., Long Island City, N. Y. He was formerly chief engineer for Bulova Watch Co., New York, where he was responsible for research and design of aircraft accessories during the war years.

R. W. Loudon has been elected president of Barn Equipment Association, Chicago, succeeding H. B. Morgan. Mr. Loudon had been vice president of the association. F. E. Myers II has been elected vice president of the organization, and R. C. Hudson, treasurer. B. J. Higgins has been named to the executive committee, succeeding F. G. Wells.

K. P. Swanson, Abington, Mass., has been appointed to represent Progressive Welder Co., Detroit, in eastern Connecticut, eastern Massachusetts, Rhode Island, Maine, Vermont and New Hampshire.

Charles J. Ramsburg Jr. and Eugene F. Conroy have been appointed assistant district managers of the New York office, Spang-Chalfant Division, National Supply Co., Pittsburgh. Edwin A. Booth has



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When mill-ordered Armco steels are unloaded in your plant you can be sure of this:

The steel is "job-tailored" to your needs—*before* and *during* rolling operations. Salesmen, metallurgists, and mill representatives all see that you get the *one right steel* for your products.

For almost 20 years Armco men have called this "Q. C."—Quality Control. Metallurgists who study your requirements specify the analysis of steel, the temper rolling, annealing, and all other operations that affect the qualities of the finished sheets. Then mill operators follow through with these instructions

on your individual routing card.

In recent years, Armco control charts and statistical analyses have further helped to assure consistent production of prime steels. They are an added safeguard for the sheets that go into your products.



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Special-Purpose Sheet Steels • Stainless Steel Sheets, Bars and Wire

"Quality Controls" like these are one reason why leading manufacturers look first to Armco for special-purpose sheet steels.

Back of it all are the research and experience that contribute to a higher "Q. C." at our end and better quality at yours. The American Rolling Mill Co., 3701 Curtis St., Middletown, O.

been named Pittsburgh district manager for the company, and Frank W. Morris, manager of the Tulsa, Okla., district. Mr. Ramsburg had been manager of the Pittsburgh district since 1939, and during the war was also manager of the ordnance department sales. Mr. Conroy had been a member of the sales staff of the company's New York office during the last 6 years. Mr. Booth had been manager of the Tulsa district since 1942. He entered the metallurgical and research departments of Spang-Chalfant in 1929, later transferring to the sales department. Mr. Morris joined the sales department of Spang-Chalfant in 1925.

David C. Crowley, Houston, Tex., has been appointed representative in Texas for Colonial Broach Co., and Colonial Bushings Inc., both of Detroit.

Astor L. Thurman has been appointed assistant to the vice president, Aetna-Standard Engineering Co., Youngstown. James Riddell has been named chief electrical engineer for the company. Mr. Thurman came to Aetna-Standard as chief electrical engineer Dec. 1, 1945, after 8½ years with General Electric Co., Schenectady, N. Y. He is a member of the Association of Iron & Steel Engineers, Wire Association, American Society of Mechanical Engineers, and American Institute of Electrical Engineers. Mr. Riddell has been in the Aetna-Standard engineering department for the last 8 years, and recently had been assistant chief electrical engineer.

H. Ward Lewis has been appointed supervisor of operations, Pittsburgh Limestone Corp., Pittsburgh, a subsidiary of United States Steel Corp., New York. He has been with the company since 1920 as engineer, assistant superintendent and superintendent. Clifton A. Pratt has been named superintendent

of the company's Kaylor Limestone Mine in Armstrong County, Pa., succeeding Mr. Lewis. Mr. Pratt originally joined Pittsburgh Limestone in 1939 as a plant mining engineer. He spent nearly 5 years in the Army.

Robert L. White has been elected a member of the board of directors of Marmon-Herrington Co., Indianapolis.

George C. Newton has been appointed Iron Mountain-Kingsford, Mich., community chairman of the Committee for Economic Development.

Wilfred D. MacDonnell has been named assistant to the general manager, Lackawanna, N. Y., plant, Bethlehem Steel Co., Bethlehem, Pa., succeeding William J. McClung. Mr. MacDonnell was assistant superintendent of the No. 1 open hearth department at Lackawanna.

Simon Edinburg, formerly with Harcon Corp., Boston, scrap dealers, has joined the Boston office of Luria Steel & Steel Trading Corp., New York.

James E. Allen, vice president, has been elected to the office of executive vice president, Aro Equipment Corp., Bryan, O.

Edward C. Hamm has been elected president, Service Caster & Truck Corp., Albion, Mich., which recently acquired the assets of Service Caster & Truck Division of Domestic Industries. Mr. Hamm had been sales manager of Service Caster & Truck Division since 1943.

F. Faxon Ogden has been appointed manager of special products sales development, and J. J. McCarthy, manager of chemical sales development in charge of new products for the paper and leather

industries, Merrimac Division, Boston. Monsanto Chemical Co., St. Louis. Mr. Ogden had been manager of chemical sales development for the company. He spent two years in the Navy during the war. Mr. McCarthy, who joined Monsanto in 1922, had most recently been manager of textile sales development.

Alexander B. Andrews Jr., Raleigh, N. C., has been appointed engineering representative in North and South Carolina for Kropp Forge Co., Chicago.

Kenneth F. Thomas has been appointed district engineer for the New England office of Kaydon Engineering Corp., Muskegon, Mich. For many years Mr. Thomas has been active in New England and the East as sales engineer for SKF Industries Inc., Philadelphia.

John M. Davidson, recently released from the Navy, has joined the sales staff, Special Chemicals Division, Pennsylvania Salt Mfg. Co., Philadelphia.

Harold E. Jalass has been appointed assistant general sales manager, Cribben & Sexton Co., Chicago. Mr. Jalass joined the company in 1917. In 1922 he joined the sales department, covering Chicago and supplementing other territories throughout the country. For the last 15 years he has been district manager for Universal Gas Ranges in the metropolitan Chicago area. He will continue in that capacity in addition to his new duties.

R. J. Allen, metallurgical engineer, Worthington Pump & Machinery Corp., East Harrison, N. J., has been appointed head of the 1946-47 program and papers committee, Gray Iron Division, American Foundrymen's Association, Chicago. R. G. McElwee, manager, Foundry Alloy Division, Detroit, Vanadium Corp. of



JAMES RIDDELL



ASTOR L. THURMAN



HAROLD E. JALASS

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... Timken Alloy Steel Seamless Tubing May Lower Your Costs

If you make a hollow cylindrical part which could be machined from tubing $\frac{1}{2}$ " to $10\frac{1}{2}$ " O.D., you should talk to a member of the Timken metallurgical staff. Great opportunities for cost reduction and product improvement are open to manufacturers through use of Timken Alloy Steel Seamless Tubing.

No other seamless tubing producer offers such a wide variety of sizes and finishes in alloy, stainless and carbon steels. No other producer has such a wide technical background for making a job analysis of your tubular parts. Write Steel and Tube Division, The Timken Roller Bearing Company, Canton 6, Ohio.

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Adaptor Sleeves	Knitting Machine Cylinders
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Armature Shaft Sleeves	
Automobile Tire Molds	Mandrels
Axle Housings	Mining Machinery
Axles of All Kinds	Motorcycles
	Motor Cylinders
Ball Bearing Races	Moving Picture Apparatus
Ball Bearing Sleeves	
Barrel Drills	Nipples
Bicycle Frames	Oil Burners
Bicycle Hubs	
Bicycle Pumps	Piston Pins
Boring Bars	Piston Rods
Boring Bar Spindles	Pneumatic Carrier Tubes
Bottle Washing Machines	Pneumatic Hammers
Bronze Bearing Shells	Pneumatic Tubes
Bushings	Printing Press Rolls
	Printing Presses
Camshafts	Propeller Blades (Aircraft)
Casting Machine Bushings	Propeller Hub Parts (Aircraft)
Chain Bushings	Propeller Shafts
Coaster Brakes	Pulley Sleeves
Collars	Pump Cylinders
Core Barrels	Pump Jackets
Core Machine Dies	Pump Liners
Cotton Picking Machinery	Pump Plungers
Cross Head Pins	Push Rods (Automobile Engine)
Cross Steering Tubes	
Crank Extension Sleeves	Radius Rods
Cylinders, All Kinds	Refrigerating Machinery
Cylinder Block Sleeves	Road Rollers
	Roller Bearing Races
Diamond Drill Rods	Rollers for Weaving Machines
Differential Bearing Hubs	
Drag Links (Automobile)	Shaft Collars
Drill Press Parts	Shells
Dust Collars	Shock Absorbers (Automobile)
	Shock Struts (Aircraft)
Elevator Plungers	Shot Gun Magazines
Emery Wheel Dressers	Shrapnel Cases
Engine Lathes	Sleeves
Engine Parts	Spacer Rings
Exhaust Pipes	Spinning Rings
Feed Bars for Mining Machines	Tool Joints
Fishing Rods	Tool Joint Sleeves
Fleece Rollers for Knitting Mills	Torque Tubes
	Trailer Axles
Gear Blanks	Track Bushings
Gravity Carriers	Tricycles
Grease Guns	Tubular Turnbuckles
Gun Barrel Drills	
Gun Barrels	Universal Joints (Automobile)
Golf Shafts	Upset Parts
Hollow Shafts	Valve Seats
Hydraulic Jack Tubes	Ventilating Machinery
Hydraulic Hoists (Auto Trucks)	
	Wrist Pins
Idle Roll Shafts	

SPECIALISTS in hot rolled and cold finished Alloy Steel Bars for forging and machining applications, as well as a complete range of Stainless, Graphitic and Standard Tool Steel analyses. Also Alloy and Stainless Seamless Steel Tubing for mechanical and pressure tube applications.

America, Detroit, has been named vice chairman of the committee, and T. D. Parker, metallurgical engineer, Climax Molybdenum Co., New York, has been named secretary.

Richard F. Muller has been named manager of the New Orleans district office, Allis-Chalmers Mfg. Co., Milwaukee, succeeding F. W. Stevens, who after 41 years of service, has requested to be released from this responsibility. Mr. Muller joined the company in 1920, and was promoted to assistant manager of the New Orleans district office early this year. He is a member of American Society of Mechanical Engineers. Mr. Stevens, who continues with the company as a special representative in the New Orleans office, joined Allis-Chalmers in 1905 as a correspondent in the Atlanta office. He had been district manager at New Orleans since 1912.

William V. Pyndus has been placed in charge of the new Syracuse, N. Y., office, open Sept. 1, of Penflex Sales Co. Division, Pennsylvania Flexible Metallic Tubing Co., Philadelphia. The territory served by Mr. Pyndus was formerly covered by four other branch offices, and will include such cities as Binghamton, Buffalo, Elmira, Jamestown, Niagara Falls, Rochester, Rome, Schenectady and Utica, all in New York. Mr. Pyndus has been at the company plant in Philadelphia and at the New York office during the last month.

J. Donald Zaiser has been elected president, Ampco Metal Inc., Milwaukee, succeeding his father, the late C. J. Zaiser. Mr. Zaiser, who had been executive vice president since March, 1944, also will be general manager of the firm. He joined Ampco in 1933 in the

production department. He transferred to the field sales department in 1934, and became department manager in 1936. He became general sales manager in 1938, and vice president and assistant general manager in 1940. In March, 1944, he became executive vice president, and was given the added duties of general manager in March, 1945.

F. L. Steuber has been appointed assistant general manager of sales, Central Iron & Steel Co., Harrisburg, Pa. Prior to joining the Central organization as Philadelphia district sales manager in Sept., 1945, Mr. Steuber had been with Heat Transfer Products Inc., New York. Before that, he had been in Philadelphia for many years with Carnegie-Illinois Steel Corp., Pittsburgh, a subsidiary of United States Steel Corp.

John A. Sargent, recently released from the Army, has been elected treasurer, Diamond Alkali Co., Pittsburgh. He had been vice president and general sales manager of Truscon Steel Co., Cleveland, a subsidiary of Republic Steel Corp., Cleveland.

J. M. Reynolds has been appointed executive assistant, Birmingham Electric & Mfg. Co., Birmingham. L. E. Sostner has been named auditor of the company, succeeding Mr. Reynolds.

Frank J. Hughes has been appointed sales manager, Heating & Air Conditioning Division, Gar Wood Industries Inc., Detroit.

Moorhead Wright Jr. has been appointed to the staff of L. R. Boulware, vice president, General Electric Co., Schenectady, N. Y. Mr. Wright will assume new duties in the executive de-

partment of the company in New York Sept. 3. He will be succeeded as manager of the apparatus department's employee information division in Schenectady by D. J. Sullivan. Mr. Wright joined General Electric in 1927, and has held his previous position with the company since last year. Mr. Sullivan joined G. E. in 1934, and has been associated with the employee information division since his release from the Army last November.

Horace B. McCoy has been appointed director, Office of Domestic Commerce Department of Commerce. He had been serving as acting director of the office since May 1, when Gen. Albert J. Brown resigned to become director of purchases for Ford Motor Co., Dearborn Mich.

Robert F. Thomas has been appointed vice president, Hardy Mfg. Corp. Pendleton, Ind., makers of radiator shutters and metal stampings. Mr. Thomas has been in charge of operations since 1940. A. A. Pfaff has been advanced to the position of treasurer.

R. E. Lynch has been named manager of the newly organized transmission engineering department, Allison Division General Motors Corp., Detroit. J. E. Storer will be chief ordnance engineer and R. M. Shaefer, chief commercial engineer on transmission projects.

William J. Reagan has been appointed associate professor of metallurgy, Pennsylvania State College, State College, Pa. He will specialize in the extractive metallurgy and primary processing of iron and steel. In addition to teaching, he will do consulting work and will also have charge of an experimental steelmaking



W. H. MARSH

General manager of the new Hydraulics Division, Rockwell Mfg. Co., Pittsburgh, noted in STEEL, Aug. 26 issue, p. 68.



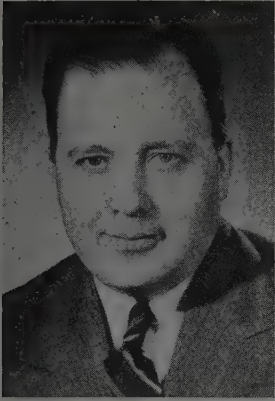
C. H. PELL

Director of purchases, Ward LaFrance Truck Division, Elmira, N. Y., Great American Industries Inc., STEEL, Aug. 26 issue, p. 70.



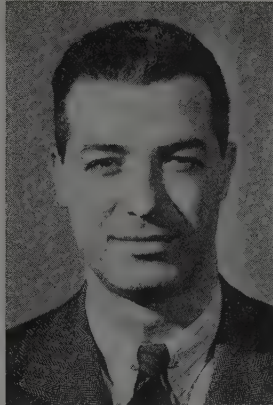
WILLIAM J. MCCLUNG

Who has been named general manager, Bethlehem Pacific Coast Steel Corp., noted in STEEL, Aug. 19 issue, p. 95.



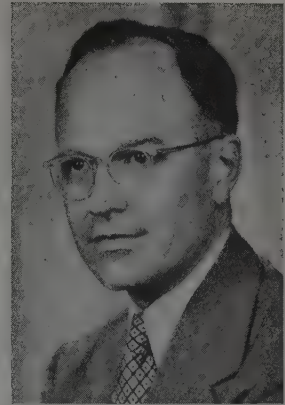
RALPH R. NEWQUIST

President in charge of sales, Roots-Combs Blower Corp., Connersville, Ind., noted in STEEL, Aug. 26 issue, p. 70.



A. D. ANDRIOLA

Appointed chief research engineer, De Laval Steam Turbine Co., Trenton, N. J., noted in STEEL, Aug. 26 issue, p. 68.



W. C. STEVENS

Who has organized his own company, Stevens Mfg. Co., Mansfield, O., noted in STEEL, Aug. 26 issue, p. 66.

Program. Professor Reagan had been research metallurgist with the Warren, O., Division of Copperweld Steel Co., Glassport, Pa. Prior to that, he was assistant superintendent of open hearths at Edgewater Steel Co., Oakmont, Pa.

R. A. Williamson has been appointed manager, Railroad Rolling Stock Division, Transportation Divisions, apparatus department, General Electric Co., Schenectady, N. Y., succeeding F. Perkinson who has been transferred to the Transportation Engineering Division. Mr. Williamson will be responsible for the sale, application and servicing for all company railroad rolling stock business. He joined General Elec-

tric in 1927, at the Erie, Pa., works. He had been marine engineer for the company's New York district since 1944.

D. A. Nabb has been appointed assistant sales manager, Detroit Seamless Steel Tubes Co., Detroit. He has been with the company, in the sales department, since November, 1945.

Theodore A. Smith has been promoted to the post of general sales manager, engineering products department, Radio Corp. of America, New York.

Leonard T. Beale, president of Pennsylvania Salt Mfg. Co., Philadelphia, and Richard T. Davies, assistant to the presi-

dent of Pennsalt, have received the King Christian X Medal of Liberation from King Christian X of Denmark.

Brig. Gen. William W. Welsh, former assistant chief of air staff, Army Air Forces, has been appointed technical advisor to the general manager, Aircraft Division, Fairchild Engine & Airplane Corp., New York.

William R. Thompson, Washington, Pa., has been appointed district manager for western Pennsylvania, Geary Stainless Steel Co., Baltimore. Edward G. Cressell, Chicago, has been named district manager for Illinois, Indiana, and southwestern Michigan territory.

BITUARIES....

Charles H. McCrea, 56, for the last 4 years president, National Malleable & Steel Castings Co., Cleveland, died after completing a round of golf at the Pep Pike Country Club near that city, Aug. 24. He had been with the company since 1913. He was a director of Lorlake Iron Corp., Cleveland, and Lway Business Association. Mr. McCrea was a former trustee of Malleable Founders' Society and a member of Steel Founders' Society of America.

Carl D. Bushnell, 65, founder and president of Bushnell Machinery Co., Springfield, Mass., died Aug. 24.

Frank J. Seng, 77, since 1900 president of Seng Co., Chicago, died Aug. 18 in that city.

Henry De Huff, partner in the firm De Huff & Hopkins, Philadelphia, Manufacturers' representatives, died Aug. 24. For more than 25 years, he re-

presented Easton Car & Construction Co., Easton, Pa., in the Philadelphia area as sales engineer for industrial material handling equipment.

Gerald Thorp, 53, vice president, Bethlehem Foundry & Machine Co., Bethlehem, Pa., died in that city, Aug. 23. He joined the company in 1935.

Albert Sears Crane, 78, who retired ten years ago as vice president of J. G. White Engineering Corp., New York, died in Bar Harbor, Me., Aug. 23. He specialized in hydraulic engineering, and was a director of the White Company at the time of his death.

William Martin Wampler, 79, manufacturer of railroad equipment, died recently in New York. He was president and a director of National Brake Co., and Elcon Co., both of New York.

Col. Sir Thomas Andrew Polson, 81, British industrialist, died in London, Aug. 22. He was chairman of Butlins

Ltd., Duffield Iron Corp. Ltd., James Walker, Goldsmith & Silversmith Ltd., and Rolls Razor Ltd.

Charles J. Pilliod, 84, who retired 2 years ago as president, Standard Locomotive Equipment Co., Toledo, O., died recently.

Jacob Fischer, 79, who retired 15 years ago as president, David Architectural Iron Works, Chicago, a company which he founded in 1923, died Aug. 22 in that city.

Edward P. Welles, 76, chairman, Charles H. Besly & Co., Chicago, died in that city, Aug. 24. He joined the company as an office boy at the age of 16, became general manager in 1898, president in 1909, and chairman of the board in 1942.

Paul Shuman, 62, treasurer and member of the board of directors, Atlantic Refining Co., Philadelphia, died at his home in Malvern, Pa., Aug. 22.

Economic Aspects of

TUBE BENDING

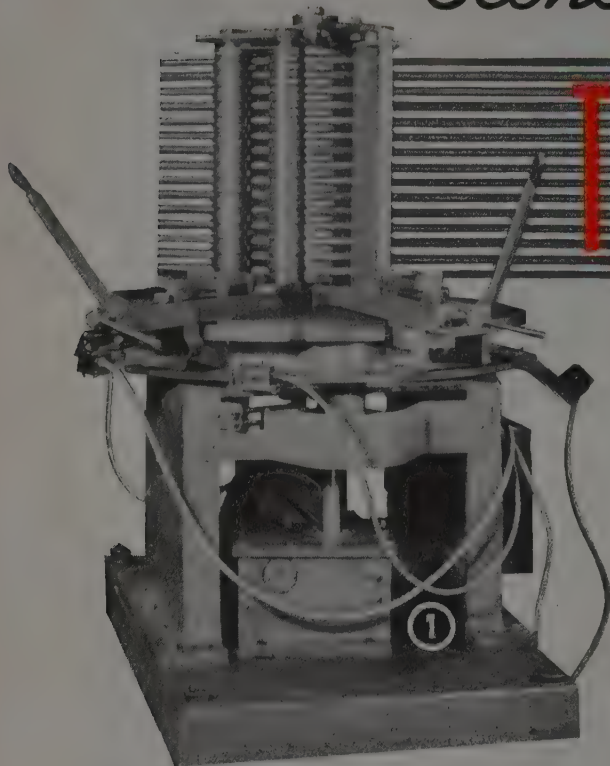


Fig. 1—Multiple die bender for tubular furniture capable of bending fifteen 1-in. tubes at one time, thus lowering unit costs

BENDING machines, like all other machines, are bought for economic reasons. The question is not so much "how is it made" but "what will it do." For this reason, it is customary to build modern machines for as high production as is feasible, which means low cost for the piece produced. It should be pointed out that the cost of the piece produced is a function of labor, overhead material and machine cost. Over material and labor, the machine builder has little control. Consequently the production of his machine carries more weight than any other item in computing the final cost.

Amortization, interest on investment and maintenance, reduced to an hourly cost, constitute machine cost. To this is added labor and overhead. This is on an hourly basis. Dividing by the production per hour gives the cost for fabricating each piece. Addition of the material provides the cost per piece. Since production generally varies as first cost, the accompanying table is illustrative of this thought.

The reason for the above is because *genus homo sapiens* is long on brains but short on horsepower. Some employers are prone to buy man-made horsepower which is very expensive. A strong man, worth \$1 per hour, can generate $\frac{1}{4}$ hp, so manpower costs \$8 per horsepower-hour during an 8-hour day. You can buy all the electric power you want for 2 cents per horsepower-hour consequently manpower is very expensive, to say the least, and not very satisfactory.

In fabricating tubular parts, closer study may well be given to machine production as this is the factor in costs which may be more closely controlled.

By RALPH SHAW JR.

President
Pedrick Tool & Machine Co.
Philadelphia

To obtain maximum production it is necessary to do the following things: (1) Make the machine do everything but think; (2) make the machine do as many things simultaneously as possible; (3) use multiple production and (4) design your product for manufacturing as well as artistic reasons.

Consider the tubular furniture business. There are many kinds of articles to be made—for one, the chair with arms—known as the S chair, because of its shape. The S chair usually has six vertical and two horizontal bends, but sometimes has four of the latter. The horizontal bends are used as a base on the floor. It is generally made of 1 in. tubing.

The six vertical bends may be made on a production bender 10 at a time. Two passes may be made per minute for power benders and five for automatics. Let us now consider the power benders. Two passes of 10 each gives 20 bends per minute or 3 $\frac{1}{3}$ chairs per minute. But it is necessary to apply the horizontal bend which is out of plane and therefore must be applied one at a time. This requires 2 min for two bends, or 2 min per chair. The total time required to bend one chair is therefore 2 $\frac{1}{3}$ min, which means a production of about 25 chairs per hour. If, however, horizontal bends are made in separate piece and welded, brazed or shrunk on after bending, all of the bends may be made in multiples of 10, giving a production of 2 $\frac{1}{2}$ chairs per minute or 150 chairs per hour.

In the first case, the chairs are costing 13.6 cents per material; in the last, they cost 2.2 cents plus material plus welding or putting together the three parts. This is known as "designing for manufacture".

The production machines required to handle tubular furniture are composed of four parts:

(1) The loading mechanism; (2) the feeding mechanism; (3) the bending device; and (4) the ejector.

Such a machine will take tubing off a conveyor, load it, feed, and bend it, and eject the finished parts without any manual attention whatever. This is a truly automatic

tic machine. Usually these machines handle from 10 pieces in multiples so long as all the bends are the same plane. With automatic feeds and loading, one or four passes as an average can be obtained per minute, and if 10 pieces are being bent in multiples at 10 passes per minute, production can be 40 bends per minute or 2400 bends per hour. This is a theoretical figure and such a machine would be classed as a "1000-piece bender".

Few people realize that speed of the machine is dependent on handling and not on bending. A machine may make a bend in 1 sec, but if it takes 5 min to load and decide where to make a bend, the production will be a little less than 12 bends per hour. For this reason, many machines are bought without loading, feeding or unloading devices with the result that the operator must do the work. Such a machine becomes a simple production order and requires more operator attention. Production speeds range up to 1000 bends per hour so that these machines are classed as "500-piece benders", as it is customary to under-rate production by as much as 50 per cent for a factor of safety.

There are four standard methods of bending tubing, namely, compression, drawing, rolling and ram processes. The first two are called "rotary head" processes and are the usual processes for tubular furniture bending. In the compression process, the die or central roll is stationary and the piece is wiped into it. In this case, the piece is stationary and is not usually clamped. No internal support is generally employed although a "snake" or flexible mandrel is sometimes used, though not in the furniture trade. When used, the snake is mounted on the bending die and recedes with it. When a snake must be used, it is usually not desirable to bend furniture in compression, though not impossible.

The drawing process comprises the use of a rotating die or roll to which the piece being bent is clamped. Since flattening of such a process is severe, internal support

is usually employed and the piece being bent is drawn over it, hence the name. Such a bend can be to a very close radius without wrinkling and very thin tubing may be used if desired, limit being obtained by degree of draw in the periphery of the bend. Due to the presence of the mandrel, the draw machine is much more complicated, but high production can be insured if necessary. The first cost is usually about 50 per cent higher, and the weight is about double but horsepower required is considerably less.

Main difference between the compression and the draw processes lies in the position of the neutral axis. In the former, this axis is in the outer third of the section; in the latter, it is in the inner third. This means that for the former, about two-thirds of the piece is in compression while for the latter, two-thirds is in tension. For this reason, chromium plated tubing can be bent in a compression machine without stripping off the plating so long as the radius is not too close. The same is true of enameled tubing. Structural shapes may be handled in either machine as well as aluminum or stainless steel.

Quality of bend is often determined by what is being bent. The furniture trade (Please turn to Page 144)

AMORTIZATION OF TUBE BENDING EQUIPMENT

	Hand Bender	Power Bender	Automatic
First Cost	\$1500	\$3000	\$10,000
5 yr. Amortization (per year) ..	300	600	2,000
Interest—4%	60	120	400
Maintenance	40	80	600
Total Cost per yr.	400	800	3,000
Cost per hr.	0.20	0.40	1.50
Direct Labor	1.00	1.00	
Overhead	2.00	2.00	2.00
Total Cost per hr.	3.20	3.40	3.50
Production per hr.	150	300	1,000
Cost per piece	0.0213	0.014	0.0035

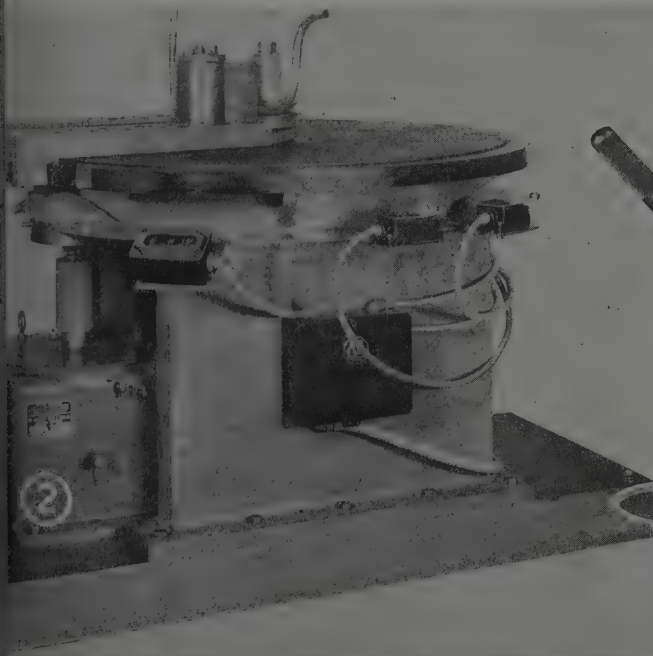


Fig. 2—Simple power bender for tubular furniture. Machine is for either right or left-hand bending. Use is unsound economically for production jobs as the output is relatively low

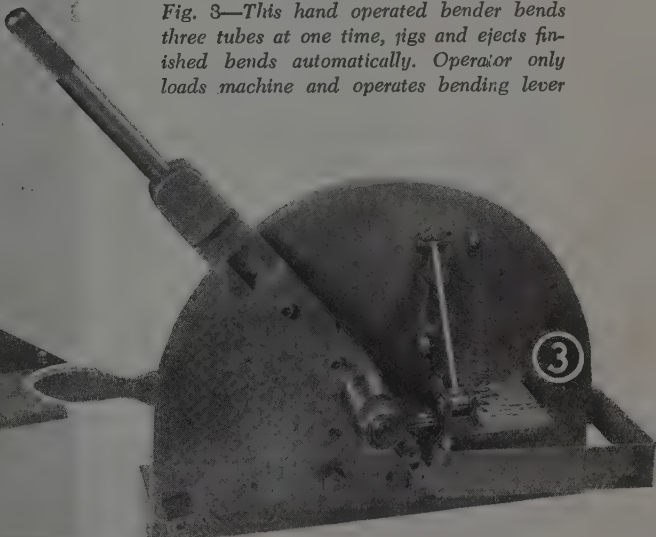


Fig. 3—This hand operated bender bends three tubes at one time, jigs and ejects finished bends automatically. Operator only loads machine and operates bending lever

Drying Stopper Rods

INSTALLATION of a new type of recirculating convection oven at the Scullin Steel Co., St. Louis, eliminated many of the uncertainties in drying and handling of stopper rods. Formerly the rods, used in steel mill ladles, were dried by means of blow torches or small wood fires. This method of drying was spotty, and the rods were not always ready when required. Improper drying often caused splattering of metal—a definite hazard to the safety of the worker nearby.

With this new rod drying oven, designed and built by Despatch Oven Co. of Minneapolis, rods are loaded individually on trolleys in a vertical position. The trolleys, through a switching arrangement, load the rods in the oven on three tracks which run the length of the oven, each entering through a separate door. An exterior view of the oven, the overhead trolley and switching arrangement, and a rod ready to move into the oven are shown in Fig. 1.

Fig. 2 shows the interior of the oven with the stopper rods in position. At the unloading end of the oven there are also three doors—one for each line of

track, facilitating the removal of a quickly and with a minimum loss of heat in the oven. As shown in Fig. 2, tracks run alongside of oven from loading end, curving around to load end. This arrangement minimizes handling during loading and unloading of trolleys.

Stopper rods are pushed through oven manually. After one rod is removed another is put in at other end to replace it. Rods are always available when required, and are constantly at the correct temperature. Quicker and more thorough processing is claimed for this method of drying.

Interior working dimensions are 6 ft wide, 20 ft long and 10 ft 6 in. high. Capacity of the oven is 69 rods at a time, and with approximately 20 rods being used each day, each rod has a drying time of two or more days at an average operating temperature of 350° F.

A direct fired, externally mounted heater, also made by Despatch, furnishes the oven with 250,000 Btu's per hour. Heater is capable of heating oven to a temperature of 425° F if required. Temperature and safety controls are entirely automatic.

Heated air is introduced into the oven through duct work at the bottom of the work chamber with recirculating ducts at top. Separate vent removes moisture laden air to outside.

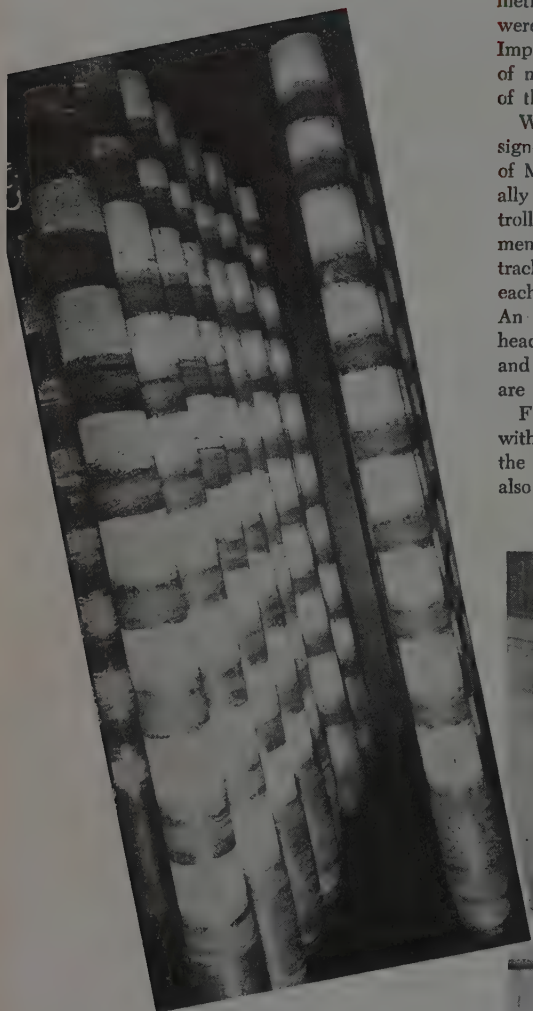


Fig. 1 (right)—Stopper rod on individual trolley ready to be loaded into oven shown in background. Rods are loaded through one of three doors, each with its own overhead track connected to loading section by a switching arrangement shown at left end of oven here

Fig. 2 (above)—Interior view of recirculating convection oven showing stopper rods in place for drying on their respective tracks



MECHANIZATION of two cast iron radiation plants, due for completion in August, will increase national production of cast iron radiation by approximately 1,000 sq ft per month, according to Lucillian Production Administration. Monthly rate of cast iron radiation production in May, June and July for the year exceeded 3 million square feet, more than double the average monthly rate in the last half of 1945.

DUE to appear on the market sometime this fall is a new oil, grease and water absorbent which, used on plant floors, eliminates danger of accidents caused by slipping and minimizes chances of flash fires. Developed by Blue Mountain Clay Co. Inc. of Memphis, Tenn., the product is made from an alumina silicate material, and is capable of absorbing from 120 to 140 per cent of its own weight. The granular absorbent is free of dust and nonabrasive; it also can be "tailor-made" to meet the user's requirements without sacrificing its absorptive qualities.

FROM Chicago, Joseph T. Ryerson & Sons Inc., advises that the Hi-Bond reinforcing bars, introduced a couple of years ago for use as concrete reinforcing steel, recently was found ideally suited for foundry gagger bar applications. Special design of the bars which consists of double reverse helical ribs between horizontal ribs provides maximum mechanical grip as well as great bonding surface for a given section of gagger bar. In addition, sand may be packed more fully and evenly around each gagger, holding the mold together more securely.

NEWS that hot-air engines of 3000 and higher were built experimentally in the Philips Research Laboratories, Eindhoven, Holland, during the war, revealed in one of the latest issues of "Philips Technical Review", received recently in Irvington, N. Y., by the affiliate organization. This is said to be the first or improvement in this type of engine over a century. The publication discusses that as a result of new principles developed, a refrigerator of high efficiency already has been proved experimentally in Holland. The article, which discusses principles of the hot-air process and the hot-air engine, is the first of a series to be published in successive issues of the Review.

NOT just a tube of metal, the tail fin is incorporated in the P-80A jet plane engineered to sustain heat, friction and pressure of a roaring blast escaping through it at temperatures up to 1700° F. Several parts are used to assemble the tail pipe. One consists of a stainless steel

cylinder 96 in. long, 21 in. in diameter on the large end, and 19 in. on the small end—the inner tube. Another part is an aluminum cylinder 94 in. long, 22 in. in diameter on the large end and 20 in. on the small end. Third part consists of stainless steel screening plus aluminum foil as insulating material between the two cylinders. In joining these parts, Solar Aircraft uses a roll-welder designed by Thomson Electric

stopped by the camera at close intervals. National Advisory Committee for Aeronautics officials say the instrument can be used to study airflow around supercharger and compressor blades where the speed may reach 20,000 rpm.

MODERN geological study, by demonstrating the presence of oil along seacoasts, has focused the attention of the petroleum industry on underwater

ENGINEERING NEWS

at a glance

Welder Co. of Lynn, Mass., to resistance weld about 1500 in. of welding required. An outside lap seam is used to seam weld the inner tube because its bore must be as smooth as possible.

IN the Aug. 19 issue of STEEL, it was reported in these columns that the Plasteel Corp., Detroit, has sold its manufacturing rights on a wax-type drawing compound (covered in a feature article in STEEL Feb. 11, 1946, beginning on page 88) and now is concentrating on the production of plastic novelties.

"Nothing could be further from the truth!" writes Dr. A. L. Bunting, president. "We have not disposed of our wax-type drawing compound nor are we in the plastic novelty business. We are essentially a chemical engineering corporation specializing in research and product development."

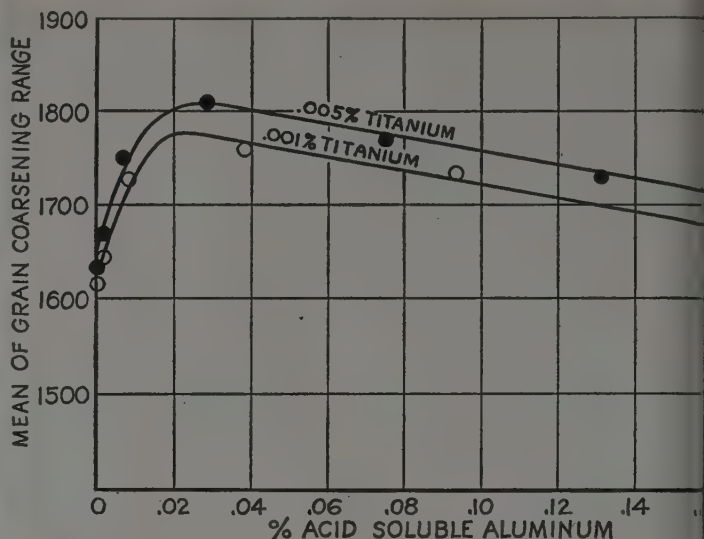
ENGINEERS at the Aircraft Engine Research lab at Cleveland airport are using photography at the rate of 200,000 frames per second to catch "knocks" in the operation of aircraft engines. The ultra high-speed camera, designed specifically for this purpose by C. D. Miller, a mechanical engineer, takes 10 photographs in the space of fifty-millionths of a second. Referred to as an optical compensatory type, it stops motion of an object traveling 4760 miles per hour. In gasoline and diesel engines, the detonation waves travel at speeds as great as 7000 fps. These waves are

drilling, particularly in the oceans along the continental shelf. Thus ocean drilling is increasing, especially along the Gulf coast, and more and more of this type of drilling is expected. So far, the American Petroleum Institute reports, drilling has not been attempted in more than 60 ft of water. Petroleum engineers, however, now are studying methods that will permit drilling operations at much greater depths.

AMONG nonferrous metals imported into Brazil during 1945 were 13,767 metric tons of lead, 379 tons of tin, 20,838 tons of copper and alloys, 2206 tons of zinc, 3663 tons of aluminum and 66 tons of antimony, according to the Bureau of Foreign and Domestic Commerce, Washington. All the antimony and approximately all the tin in ingots, bars and the like came from the United States. This country also supplied 82 per cent of the lead, 44 per cent of the zinc, 41 per cent of the copper and alloys and 36 per cent of the aluminum.

THOSE seeking a source for electrical contact springs of beryllium copper may do well to note the name of Gibson Electric Co. of Pittsburgh, in their little memo books. The company reports it recently increased its controlled atmosphere heat treating facilities to meet the increased demand for contact springs of this material. It also is manufacturing complete contact assemblies on which electrical contacts of silver, silver alloys or powdered metal compositions are attached to contact supports of various metals.

Effects of grain growth inhibitors in



By JAMES W. HALLEY

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Fine-Grained Steel

DESPITE the fact that fine grained steels have been standard products for many years, quantitative data concerning how much a certain amount of aluminum, titanium, or zirconium raised the coarsening temperature and affected the properties, all other factors being constant, are very meager. An investigation was conducted to determine the effect of individual elements on grain coarsening by adding $\frac{1}{4}$, $\frac{1}{2}$, 1, 2 and 4 lb grain-growth inhibitors per ton to a series of ingots of an open-hearth heat. Results of the investigation were reported in a paper presented before the Chicago meeting of the American Institute of Mining and Metallurgical Engineers.*

Samples were taken from the middle cut of each ingot and forged to 1-in. rounds, which were used for grain coarsening and physical tests. Steels used for the series were of approximately 0.30 per cent carbon, 0.80 per cent manganese and 0.25 per cent silicon and all samples were normalized from 1600° F prior to grain-coarsening or physical testing.

As shown in Fig. 2, (wherein the mean of the grain-

coarsening temperature after 4 hour heating is plotted against element content) maximum coarsening temperature lies in the neighborhood of 0.028 per cent acid-soluble aluminum. Additions in excess of 0.028 not only lower the coarsening temperatures but also widen the coarsening range.

A slight increase in tensile strength and decrease in reduction of area (Table I) was noted with increased aluminum content. Notched impact resistance (Table II) was also improved, temperature at which brittle failure appears is reduced and the amount of energy absorbed at room temperature is increased. This is not completely a grain-refining effect because the largest aluminum addition reduces the temperature at which coarsening starts to below the normalizing temperature of 1600° F but does not raise the temperature of brittle failure.

Effects of titanium additions were studied by adding metallic titanium to a series of ingots from two heats. It was found that titanium increases the coarsening temperature continuously up to 0.17 per cent titanium. Similar titanium additions did not cause as great an increase in coarsening temperature as similar aluminum additions but since large aluminum (Please turn to Page

*James W. Halley, "Grain-growth Inhibitors in Steel."

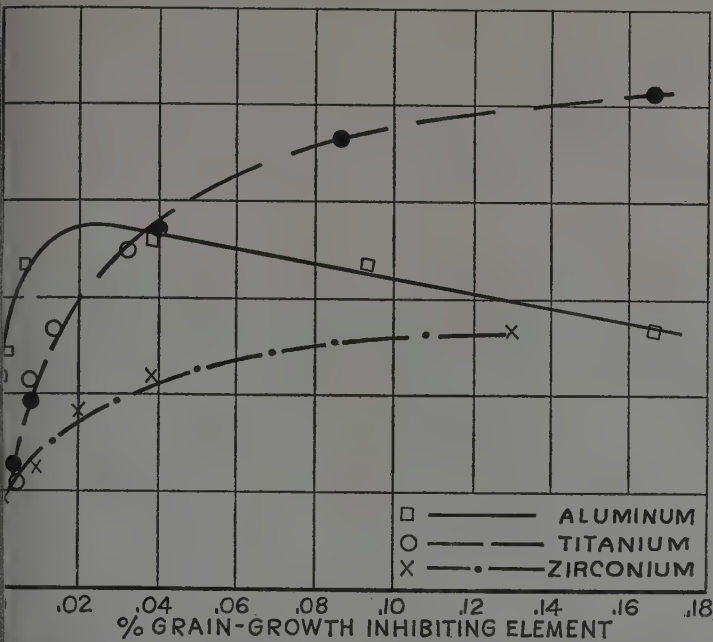


TABLE I

TENSILE PROPERTIES OF ALUMINUM SERIES

Soluble num, %	Yield Point, psi	Tensile Strength, psi	Elongation in 2 in., %	Reduction of Area, %
0	52,000	76,000	32.5	60.0
001	51,000	76,000	31.2	47.5
009	51,000	77,000	31.0	52.5
038	52,000	76,000	32.5	58.0
073	53,000	78,000	30.0	53.6
169	55,000	79,000	31.0	53.6

TABLE II

NOTCHED IMPACT RESISTANCE OF ALUMINUM SERIES

Soluble num, %	Charpy Impact, Foot-pounds					
	75° F	0° F	-25° F	-50° F	-75° F	-100° F
0	35.0-36.0	22.5-22.5	18.0-18.0	16.0- 8.5	3.0- 2.0	2.0- 2.0
01	37.0-35.0	26.5-25.0	24.5-21.0	20.0-20.0	15.0- 2.5	6.0- 2.0
09	39.0-39.0	30.0-30.0	28.0-28.5	28.5-25.5	20.5-19.5	17.5- 3.0
38	41.0-40.0	35.5-33.5	28.5-28.0	25.0-21.5	21.0-20.0	19.0-17.0
73	37.0-39.0	29.0-30.0	20.5-24.0	22.0-26.5	23.0-20.0	22.0-20.0
9	37.0-38.0	30.0-32.0	29.0-27.5	25.0-25.5	26.0-24.5	21.0-17.0

TABLE III

TENSILE PROPERTIES OF TITANIUM SERIES

Soluble num, %	Yield Point, psi	Tensile Strength, psi	Elongation in 2 in., %	Reduction of Area, %
003	50,000	81,000	31.8	56.2
008	52,000	81,000	32.2	58.9
016	52,000	81,000	31.8	54.8
033	56,000	84,000	29.5	50.1
093	42,000	77,000	32.2	59.2
008	48,000	77,000	32.2	59.8
040	51,000	77,000	32.8	58.6
045	56,000	80,000	32.5	60.3
070	55,000	80,000	31.2	60.4

Fig. 1 (left)—Effect of aluminum with varying titanium on coarsening temperature

Fig. 2 (right)—Effect of common grain-growth inhibiting elements on coarsening temperature

TABLE IV

NOTCHED IMPACT RESISTANCE OF TITANIUM SERIES

Titanium Content, %	Charpy Impact, Foot-pounds					
	75° F	0° F	-25° F	-50° F	-75° F	-100° F
0.003	29.0-26.0	21.0-19.5	18.5-14.5	3.0- 2.5	2.5- 2.0	2.0- 2.0
0.008	32.0-30.0	25.0-17.5	21.0-15.5	3.0- 3.0	7.0- 2.5	2.0- 2.0
0.016	28.0-27.5	24.0-19.5	20.0-19.0	18.0-17.0	17.0-15.5	6.0- 3.0
0.033	30.0-27.5	25.0-21.5	21.0-19.5	17.5-16.0	17.0-16.0	15.0- 4.0
0.003	36.5-34.0	27.0-24.5	21.0-12.0	18.0- 3.5	7.5- 3.0	4.5- 2.5
0.008	36.0-34.0	25.5-25.0	18.5- 4.0	21.5-19.0	2.5- 2.5	3.5- 2.5
0.040	42.0-39.5	28.5-28.5	23.0-22.5	25.0-23.0	21.5-19.0	12.0- 7.0
0.085	41.5-40.5	28.0-25.5	23.5-23.5	24.0-20.5	20.0-19.0	12.5- 3.0
0.170	37.0-36.0	35.0-24.0	23.0-23.0	22.5- 19.5	19.5-17.5	4.0- 2.5

TABLE V

TENSILE PROPERTIES OF ZIRCONIUM SERIES

Zirconium Content, %	Yield Point, psi	Tensile Strength, psi	Elongation in 2 in., %	Reduction of Area, %
None	46,500	77,000	32.5	62.0
0.009	47,000	76,000	31.2	61.3
0.021	47,000	77,000	32.2	61.4
0.038	48,000	76,000	30.0	59.1
0.134	48,000	75,500	32.0	58.7

TABLE VI

NOTCHED IMPACT RESISTANCE OF ZIRCONIUM SERIES

Zirconium Content, %	Charpy Impact, Foot-pounds					
	75° F	0° F	-25° F	-50° F	-75° F	-100° F
None	40.0-36.5	28.0-24.0	24.5-15.0	3.0- 3.0	2.5- 2.5	2.5- 2.0
0.009	38.5-37.0	33.5-31.0	31.5-28.0	25.0-16.5	3.0- 3.0	2.0- 2.0
0.021	44.5-44.0	35.0-29.5	30.5-29.0	25.0-23.0	21.5-21.0	17.5- 2.5
0.038	45.5-40.0	35.0-31.5	30.0-28.0	24.0-22.5	23.5-23.0	22.0- 3.5
0.134	41.5-38.0	34.0-32.5	27.0-26.5	27.0-24.0	21.0-20.5	17.0- 8.0

Controlling



Fig. 1—Air view of the battleship, USS California undergoing repairs in one of the Navy's largest steel floating type drydocks

Fig. 2—View of port side keel and bilge blocks used to support vessels in a floating drydock

Fig. 3—A is chart of general plan of a pontoon deck for 6000-ton steel floating drydock. B is chart showing deviations in the pontoon deck

Fig. 4—Ends being fitted to center section of steel floating drydock while secured to outfitting pier



Distortion

By WILLIAM F. DAWSON
Head Welding Practice Subsection
Navy Bureau of Yards and Docks
Washington

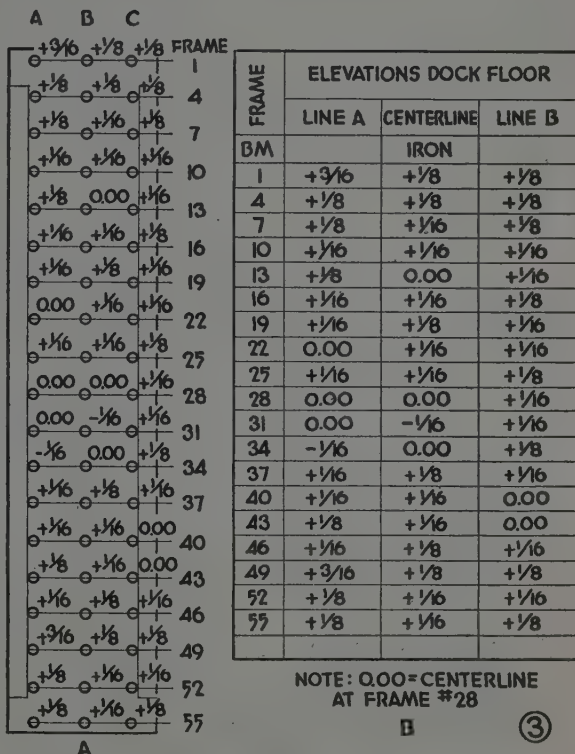
DISTORTION in welded structures may be caused by a number of factors. It may be due to welding techniques, welding, heat, atmospheric conditions or welding and erection sequences. Numerous articles have commented on the mechanics of corrective measures to overcome distortion. Actually, however, no corrective measures will prove adequate unless periodic spot checks are made to keep the weldment in certain tolerances.

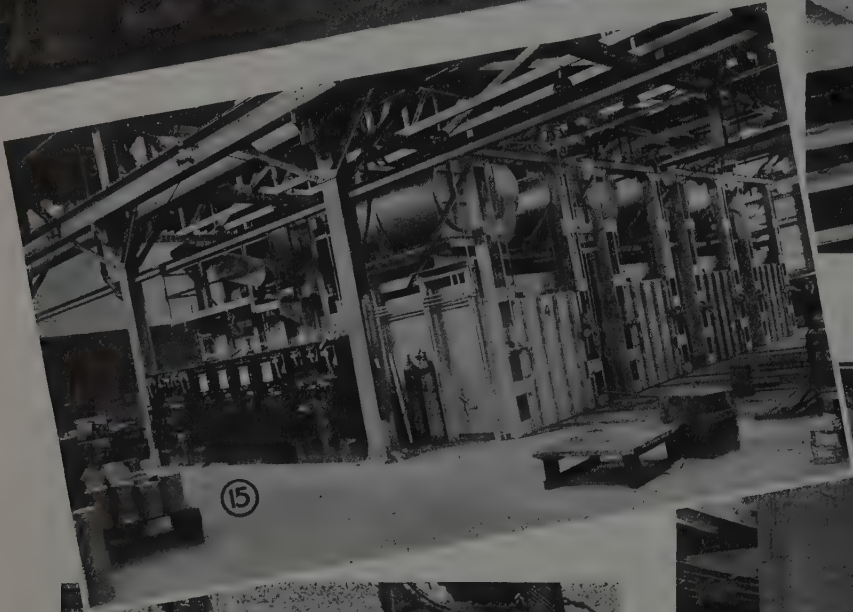
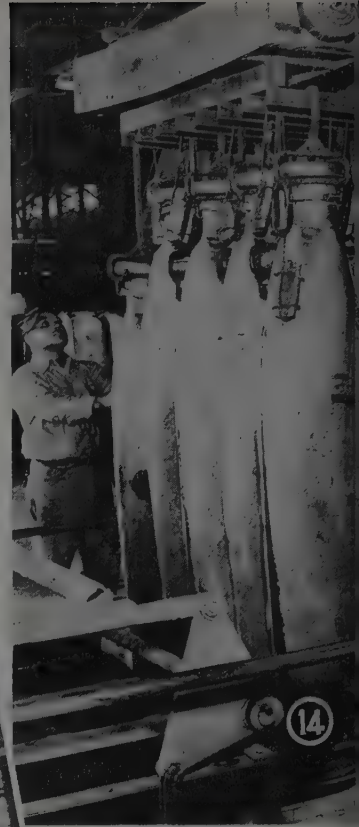
To control excessive distortion in the construction of floating dry docks during the war, a new technique was devised by welding engineers of the Navy's Bureau of Yards and Docks, working in collaboration with contractors' field engineers. Application of this technique to mammoth steel floating dry docks of 1000 to 100,000 tons capacity, reduced distortion to a previously impossible minimum.

A problem which confronted field forces of the bureau was that the docks were developing a hog or a sag amidships. Welding sequences were introduced and small adjustments were produced without too much distortion. When it came to producing pontoon decks and wing beams from 200 to 622 ft in length, within a tolerance of plus or minus of their theoretical mold line, it seemed an impossibility.

Various methods were tried, including the setting of steel wires throughout the cribbing on the ways by which it and level, for measuring (Please turn to Page 150)

System of control developed by Navy welding engineers in joining sections of huge steel floating dry docks reduces excessive distortion to a minimum





HEAT TREATING

By O. L. MITCHELL

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Reynolds Metals Co.
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Aluminum

WROUGHT aluminum alloys are divided into two main classifications—the nonheat-treatable (common) alloys and the heat-treatable (strong) alloys.

Nonheat-treatable alloys contain elements, groups of elements, or constituents that are either insoluble in aluminum or remain substantially in solid solution. Included in this group are the high purity alloys such as 99.75 and 99.99 per cent aluminum, foil, reflector sheet, and the 2S, 3S, 52S, and 56S.

Various tempers are produced by definite amounts of work after an annealing process. Annealed material is referred to as being in the "O" temper. When sufficient work has been performed to raise the tensile strength to the maximum commercially feasible, the material is referred to as being in the fully hard or "H" temper. The intermediate tempers, $\frac{1}{4}$ H, $\frac{1}{2}$ H, and $\frac{3}{4}$ H are produced by subjecting the material to plastic deformation to such a degree that the tensile strength is increased above the original properties by the appropriate fraction of the overall increase in strength commercially feasible by such methods (the difference between the H and O tensile strengths). Heat-treatable alloys contain elements, groups of elements, or constituents that have considerable solid solubility at elevated temperatures and restricted solubility at lower temperatures. Included in this group are the high copper-bearing alloys, 11S, 14S, 17S, R317, and 24S; the magnesium silicide type alloys, R353 and R361; and the zinc-bearing alloy, R303. These alloys are strengthened principally by thermal treatments supplemented by plastic deformation in special

Metallurgical factors which should be observed by plants heat treating aluminum are discussed in third article of series. Heat treating cycles, equipment, atmospheres, etc., will be covered in succeeding two articles

cases. As stated, annealed material is referred to as being in the O temper. Immediately after solution heat treatment, the material is sometimes referred to as being in the freshly quenched (FQ) condition.

The alloys 17S, and 24S are known as natural aging alloys since they precipitation harden at room temperature. The alloys that require an artificial aging treatment also age a limited amount at normal temperatures, the degree of hardening being dependent upon the alloy. Those alloys that do not attain full strength and hardness after natural aging for a few days after quenching are referred to as being the "W" temper. After fully aging, either naturally or by a thermal treatment, the alloys are referred to as being in the "T" temper.

Material that has received no thermal treatment after the final plastic deformation operations is referred to as being in the "as fabricated" or "F" temper. Solution heat-treated and aged material that has received cold work is referred to as being in the "RT" condition.

Clad Alloys: Several of the high-strength alloys available in clad form are produced by bonding layers of highly corrosion resistant material to a core of different type material. By this means, a material is produced that has special desired combinations of characteristics. For example, Reynolds Pureclad is a sheet and plate product with surface layers of high-purity aluminum to provide high corrosion resistance, reflectivity or similar special properties. If an alloy cladding is used, the material is referred to as being a clad product.

Wrought Alloys—Fundamentals: When molten pure aluminum is cooled, its temperature drops until it reaches 1214.6° F, at which time the material gives up its latent heat of fusion and solidifies in a form known as dendritic. After the entire mass solidifies, the temperature again declines as the cooling process continues.

However, the addition of soluble elements to aluminum to produce the alloys exerts a pronounced influence on the behavior of the material during the cooling period, due to the formation of primary solid solutions. Instead of solidifying at 1214.6° F, the material starts to freeze at a lower temperature and is completely solidified at a still lower temperature. The temperatures at which solidification starts and ends, referred to as the liquidus and solidus temperatures, are dependent upon type and

Fig. 13—Fabricated aluminum parts being loaded into batch type recirculating air furnace. Photo courtesy Lockheed Aircraft Corp.

Fig. 14—Lowering car of propeller blades into automatic continuous recirculation type furnace. Cars are automatically pushed through the heating chamber, rapidly removed, quenched. Photo courtesy Electric Furnace Co.

Fig. 15—Typical 4-furnace setup with automatic controls used for heat treating aluminum alloys at Reynolds

Fig. 16—Large quantities of small parts such as rivets are quickly heat treated in mesh baskets. Photo courtesy of Boeing Aircraft Co.

Fig. 17—Furnace utilizing high velocity, forced-air circulation assures fast and uniform heating of densely packed loads. Waukesha Foundry Co. photo

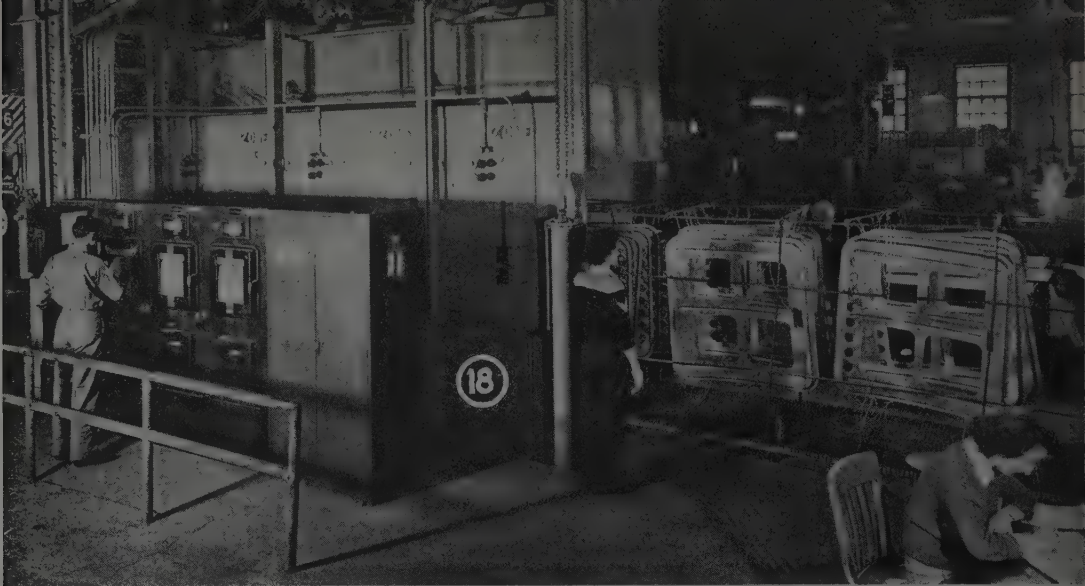


Fig. 18—Car type heat-treating furnace handling fabricated parts at Reynolds. Unit employs automatic controls for 3-zone heating

amount of the various elements added to produce the alloy.

The first portions of the melt to freeze, which usually contain very limited quantities of the alloying elements, start the formation of the grains or dendrites. As the temperature continues to drop, successive layers, containing increasing amounts of the soluble elements, solidify on the previous portion to form dendrites. Last portion of metal to solidify contains a large portion of the elements added to the aluminum. Generally this material forms a brittle phase, known as a eutectic, which freezes between the dendrites.

Presence of the layer of brittle material between the dendrites, the shape and distribution of the soluble and insoluble constituents, and the shape and size of the dendrites causes the as-cast material to have points of weakness. However, many of these inherent weaknesses can be alleviated or eliminated by homogenizing thermal treatments and by "breaking down" the as-cast structure with mechanical working processes.

Usually the first mechanical work is done with the material heated to give maximum plasticity. Subsequent plastic deformation processes may be performed either hot or cold, depending upon the shape and properties desired in the final product. After the as-cast structure of the material has been altered, the material is referred to as being in the "wrought" form.

Plastic Deformation: This technique is used to alter the as-cast structure of a material, to fabricate an alloy to its desired shape, and to harden and strengthen the class of alloys known as the nonheat-treatable alloys. When a metal is subjected to sufficient stress,

such as is produced by plastic deformation, slippage occurs along definite crystallographic planes. The number of planes upon which this slippage can take place is entirely dependent upon the crystal structure of the metal.

Aluminum, as well as most of the other easily worked metals, crystallizes in a form known as the face-centered cubic structure which possesses more effective slip planes than any other structure. Metals that possess this crystal structure can, therefore, be plastically deformed severely before rupturing occurs.

When aluminum is subjected to plastic deformation, slippage takes place along the slip planes that are most favorably oriented in regards to the direction of the applied stress. As slippage continues, the planes which are slipping change their positions in such a manner that they become less favorably oriented to be applied stress than are other planes, therefore slippage begins along these other planes. As the degree of plastic deformation progresses, the planes continue to change their orientations and the metal becomes increasingly difficult to work.

The changing of the positions of the slip planes, often referred to as "rotation" of the slip planes, produces a condition wherein a substantial number of the planes have the same orientation. This condition is known as preferred orientation and is one of the reasons why some material forms "ears" when deeply drawn.

Direction of the preferred orientation in cold-worked aluminum depends upon the thermal treatments, the degree of plastic deformation, and the direction of the applied stresses which produced the orientation. There may be prefer-

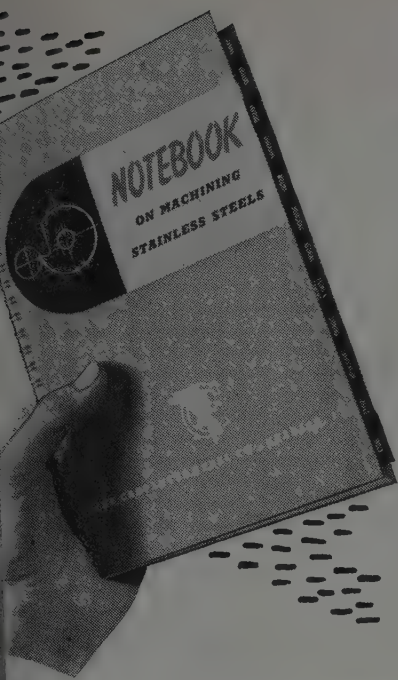
red orientation in more than one direction. For example, the processes in the production of wire, and in some cases extruded shapes, often produce a condition known as the double fib structure which contains preferred orientation in two principal directions.

The slipping of the planes naturally causes fragmentation of the grains, increasing the degree of cold working, increases the amount of fracturing of grains that take place, with the grain coming elongated. The amount and directions of the elongation are closely associated with reduction of cross-sectional area and direction of working.

Cold working increases the total internal energy of the material, thereby producing an unstable condition. The amount of extra energy stored in the material is dependent upon the degree of cold work and upon the inherent characteristics of the material.

Due to preferential slippage, this extra energy is not equally distributed throughout the material but is more concentrated at certain points, giving exceptionally high energy values. These highly stressed points, being less stable than the remaining portion of the material, serve as nuclei in the formation of new grains during the recrystallization process.

Slippage along the slip planes is restricted in several ways. The distortion of the space lattice by atoms of alloy elements in a solid solution or by mechanical strain restricts slippage. The presence of insoluble or precipitated constituents can exert a keying effect which also restricts slippage. Small grain size is still another factor, in this it is due to the interference of the grain boundaries. There are many other



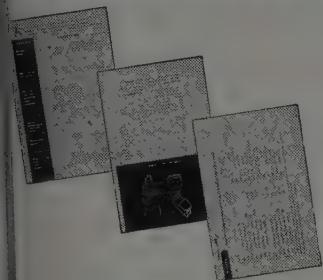
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tors, such as interatomic cohesion forces, but the above are the major ones closely associated with plastic deformation.

Cold working aluminum increases the tensile strength, the yield strength and the hardness, but decreases the ductility properties such as the per cent elongation, the impact strength and the formability.

Recovery takes place during the initial stages of an annealing or a solution heat-treating process. During this period some of the internal stresses are relieved with a recovery of part of the ductility lost during the cold working operations. Degree of stress relief during the recovery period is dependent upon both time and temperature. With some alloys, particularly 3S, a fast heating rate through this period is essential for the production of fine-grained material. If the heating rate is slow, the elimination of the highly stressed points, produced by cold working, may be sufficiently great to produce a coarse-grained material upon recrystallization.

Recovery is the principal reaction that takes place during the annealing of hot-worked material (material plastically deformed above the recrystallization temperature). This is also true for material that has received an amount of cold work insufficient to cause recrystallization.

Recrystallization: When cold worked material is heated to a sufficiently high temperature, the fragmented particles, produced by the cold working process,

form new unstrained grains provided sufficient cold work has been performed on the material. This is recrystallization.

The high energy points created during the cold working process serve as points of nucleation for the formation of the new grains. The formation of the new grains removes a substantial amount of the effects of the cold work, tending to produce properties similar to those originally possessed by the material.

Degree of cold work is important; an insufficient amount prevents occurrence of recrystallization; "just enough" cold work produces material with a very coarse grain size whereas presence of a substantial amount of cold work promotes formation of fine grained material. There are several recognized fundamental laws of recrystallization: (1) Increasing the degree of cold work decreases the temperature necessary for recrystallization. (2) Increasing the length of time at temperature decreases the recrystallization temperature. (3) The rate of heating to and through the recrystallization temperature affects the size of the grains formed. (4) The degree of cold work and the temperature employed affect the size of the grains formed.

It is usually desirable to have a material possessing a medium-to-fine grain size for severe drawing operations. While large grained material actually has a greater capacity for plastic deformation than fine grained material, such material also has a greater tendency to deform

locally or neck down, and may produce an undesirable surface appearance, as orange peel.

The final grain size of a recrystallized material is dependent upon size of the grains after recrystallization and upon grain growth. These, however, are influenced by many factors, such as:

- (A) Original grain size
- (B) Degree of cold work
- (C) Heating rate
- (D) Final temperature
- (E) Length of time at temperature
- (F) Composition

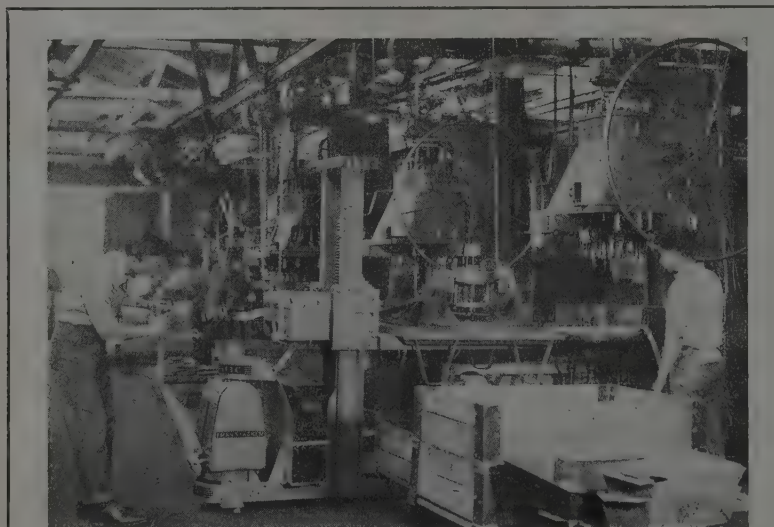
(A): The effect of the grain size of the original material on the recrystallization process is apparent only with degrees of cold work. The degree of strain hardening obtained by a certain amount of cold work is dependent upon grain size of the original material, but less for large grained material. Equal amounts of strain hardening in material of original grain size has no appreciable effect on the final grain size. In cases where the amount of plastic deformation is slight, the grain size of the original material has a noticeable effect on the final grain size.

Many forming operations are such that a portion of the metal is worked to a critical amount, producing an abnormal grain size upon recrystallization. This condition can be alleviated by the choice of alloy temper and by controlling the degree of cold work between treatments.

(B): Material that has received a limited, but critical, amount of cold work may have an abnormally large grain size after recrystallization. For this reason, controlled amounts of cold work between thermal treatments is standard mill practice. There may, however, be an occasional application where a portion of the metal receives just enough strain hardening to put it in a zone which, upon recrystallization, produces coarse grains.

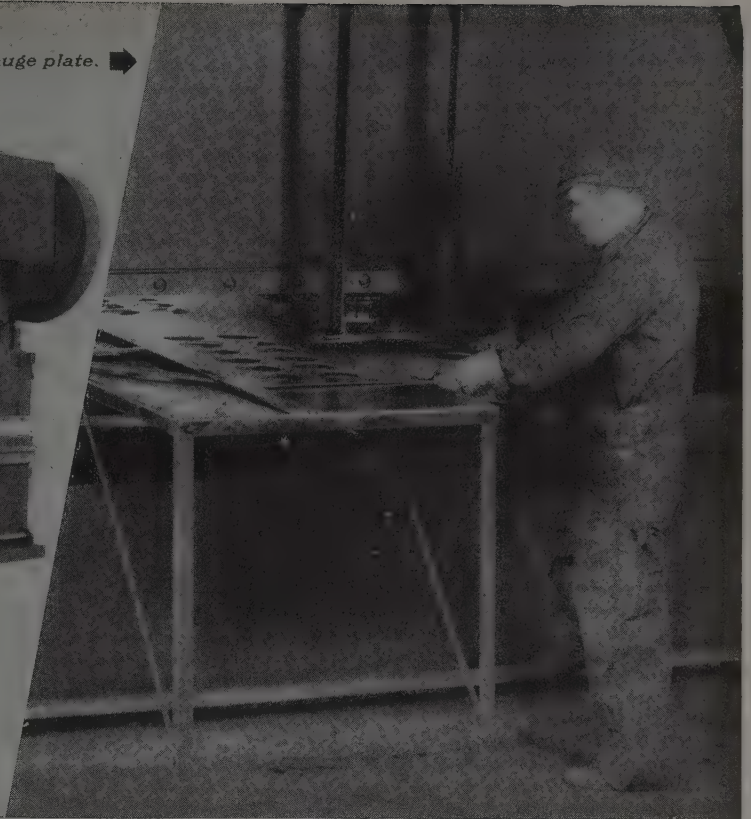
For example, the extrusion process (used to produce shapes) often extrudes the metal in such manner that both recrystallized and unrecrystallized structures may be present after thermal treatment. Some of the larger heat-treated extruded shapes possess a band of recrystallized grains near the surface, then a layer of large recrystallized grains, and finally an area of unrecrystallized material. Degree of cold work produced during extrusion produces these abnormally large grains, but always small, depending upon the type of cold working, as well as heating rate and maximum temperature of subsequent thermal treatment.

(C): The heating rate during an annealing treatment may affect the grain size of a few of the alloys regardless of degree of cold work present. Ex-



SMALL BUT MIGHTY: Movements of above Transtacker manufactured by Automatic Transportation Co., Chicago, are "finger-tip" controlled in positioning a heavy fixture on a drill press. Versatile industrial truck handles work of high-lift platform and fork lift trucks where size and weight make larger units impractical. Made to clear 7-ft doors, unit raises loads of 4000 lb to a height of 68 in. According to Elmer F. Twyman, general manager of Automatic, prices for all models are below \$2100

Punching 8" dia. holes in 12 gauge plate. ➡



8-INCH HOLES

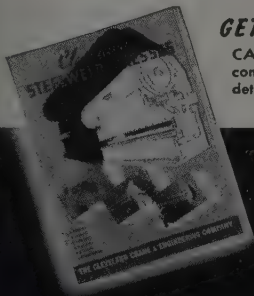
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CLIPPER CLEANING: Turkish bath for this Pan American Airways clipper includes use of new liquid compound, water soluble steam cleaner developed recently by Penetone Co., Tenaflly, N. J. Possessing high alkalinity, new detergent is said to remove grease, oil and grime accumulations without affecting paint or other finishes. No premixing is necessary since water and liquid compound are poured directly into cleaning equipment tank

a slow heating rate permits the recovery period to exert a greater than normal influence, with the resulting recrystallized grains being somewhat larger. It should be recalled that some of the stresses which promote recrystallization are relieved during the recovery period.

(D): After recrystallization, the new grains are subject to growth. This growth is caused by the tendency of the grains to revert to their lowest energy form. Increasing the final temperature theoretically promotes grains growth. However, with aluminum alloys, the advantages gained by a fast heating rate often completely overshadow the advantages of using a lower temperature.

In the majority of cases the practices for the various thermal treatments are controlled by factors other than grain growth after recrystallization, the final grain size being affected to a greater degree by other factors.

(E): Increasing the time at temperature promotes grain growth. However, considerations other than grain growth are of far more practical importance when establishing procedures for the various thermal treatments. Abnormally long soaking periods should be avoided for metallurgical reasons given later.

(F): The inherent characteristics of the various alloys play a very important role in the final grain size of material subjected to thermal treatment. With some alloys, such as 2S, the heating rate is not considered critical, while with other alloys, such as 3S, a relatively fast heating rate is an absolute necessity if fine grained material is desired. The practices given for the various thermal treatments consider these characteristics.

Annealing, Basic Principles: Many fabricating procedures for the wrought aluminum alloys incorporate an annealing treatment. The anneal may be required to remove the effects of plastic deformation or to soften solution heat-treated and aged material. The practices used for each of these types of material are different but their purposes are identical—to obtain material of optimum workability.

To obtain annealed material with optimum workability, the following requirements should be met:

- Complete recrystallization
- Equiaxed grains of optimum size
- Random orientation of slip planes
- Low degree of solid solution
- Uniform distribution of insoluble and precipitated particles

Optimum size insoluble and precipitated particles

It should be realized that these are ideal requirements that are seldom completely fulfilled in actual practice. However, they are the basis upon which annealing practices are set. Any change from the annealing practices given should be taken with these points under consideration.

Mechanics of Annealing: Recovery takes place during the initial stages of the annealing process. During this period some of the internal stresses are relieved with a recovery of part of the ductility lost during preceding cold working operations. As the annealing process continues, the temperature becomes sufficiently high to permit the fragmentation of the original grains to recrystallize, forming new unstrained grains. This, of course, will take place only if sufficient cold work is present in the material.

After recrystallization, the new grain structure is subject to growth, due to the tendency of the grains to revert to their lowest energy form. However the final grain size of annealed material generally is not substantially affected by grain growth after recrystallization. A notable exception is high-purity aluminum.

There is no definite breaking point between the periods of recovery, recrystallization, and grain growth. It is known that the recovery period comes first, that grain growth must, of necessity, follow recrystallization. Since the recrystallization process is a time-temperature stress reaction, it is entirely probable that recovery, recrystallization and grain growth are occurring simultaneously in various parts of the material.

Effect of Soluble Constituents: Basically, the mechanics of annealing all worked material is the same, but the addition of the elements used to produce the heat-treatable class of alloys may require it necessary to modify the practices used with these alloys.

Heat-treatable alloys contain elements that possess considerable solid solubility at high temperatures and restricted solubility at lower temperatures. Annealing practices, therefore, must be such that the effects of cold work are removed without obtaining a solution heat-treatment effect.

Effect of Previous Heat Treatment: Annealing of solution heat-treated aged material requires additional modification of practices because the finely dispersed precipitate must be coarsened by using a higher than normal temperature. However, at this temperature solution of the precipitate is also occurring. Therefore, after coalescence, a slow is required to allow the constituents to go into solution to re-precipitate.

(Continued next week)

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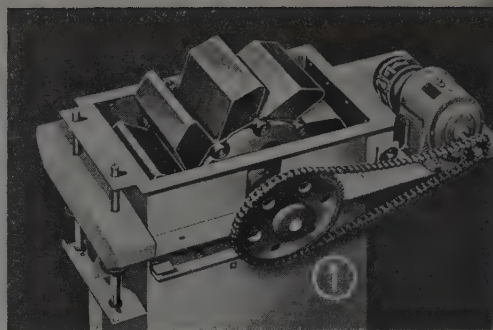
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Loop-type BUCKET ELEVATOR

HANDLES DELICATE PARTS

WHEN the Army Ordnance department set its sights on monthly delivery of a billion rounds of machine gun ammunition, traditional arsenal handling methods were found to be unable to supply parts in sufficient quantity to meet the accelerated demand. An internally loaded loop-type elevator designed for continuous operation was developed by Link-Belt Co., Chicago, to handle parts including disks, cups, cases, bullet jacket cups and other components.

The bucket elevator is now adapted to peace-time handling of small, delicate, manufactured parts such as bolts, nuts, stampings, through a generally upward

motion. Elevating medium consists of endless series of overlapping inward opening continuous buckets supported by the pins of a wide strand of SS type roller chain which is operated slowly by sprocket wheels at top of lift, Fig. 1, at foot is guided by curved steel tracks.

Buckets are open only in the back to permit internal loading at foot, chute extending directly through the side of the steel casing which encloses the elevator. Material flows directly into the backs of buckets.

Elevator is loaded on both sides, either by hand or by automatic means. (Please turn to Page 149)

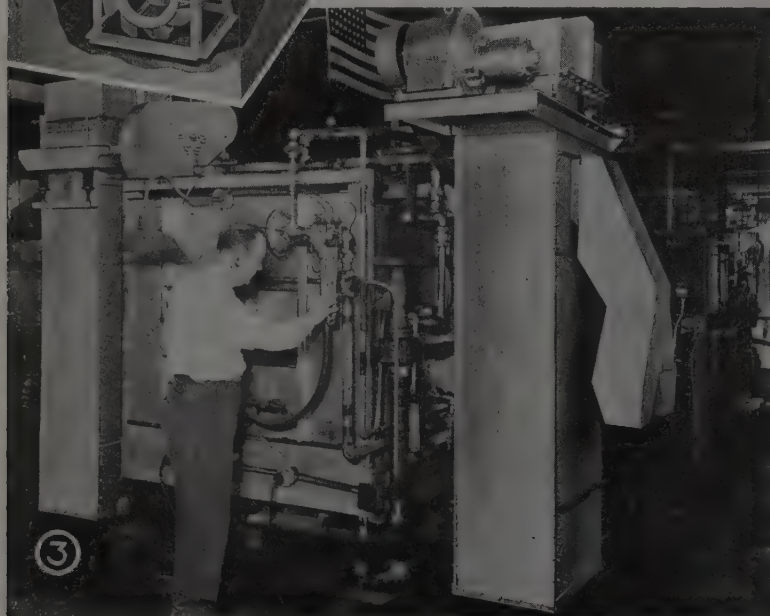
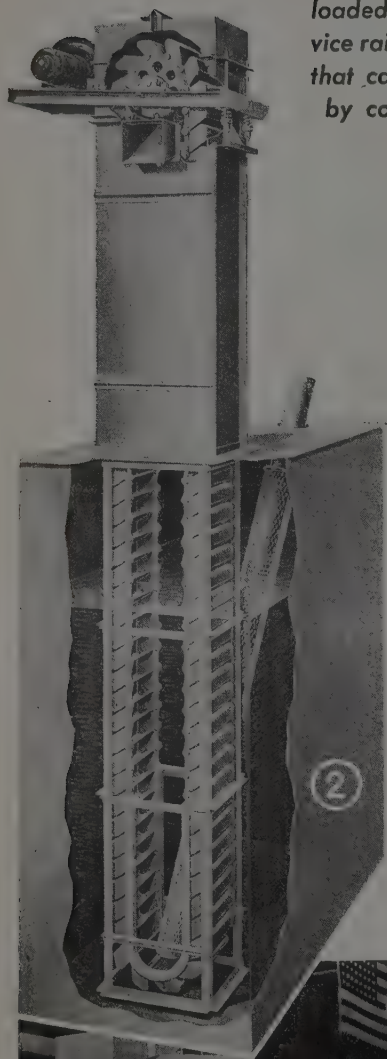


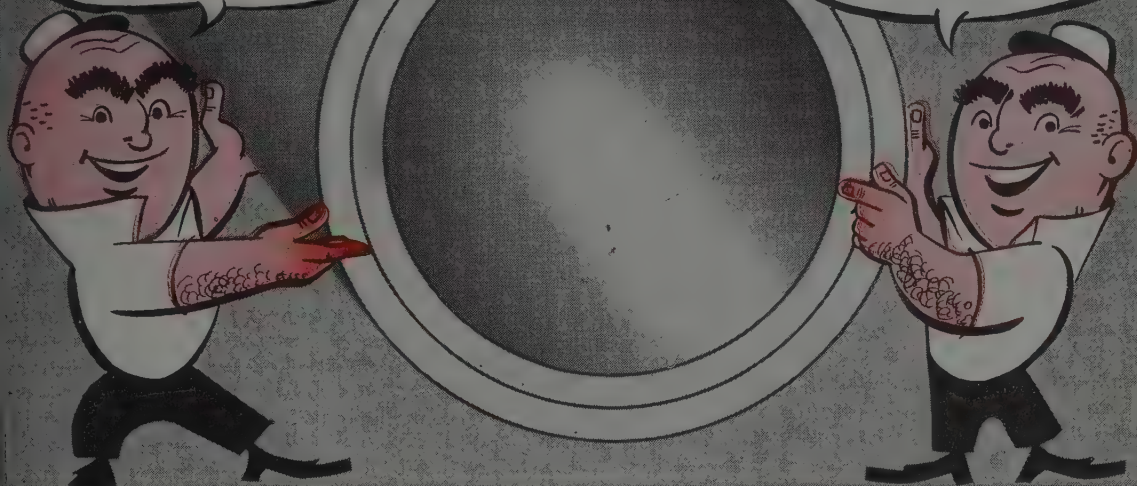
Fig. 1 — Unloading zone showing buckets, head sprockets and arrangement of take-up and drive of internally-loaded, loop-type bucket elevator

Fig. 2—Single head shaft type elevator lifts metallic pieces out of oil quench tank. Perforated buckets permit oil to drain back into the tank

Fig. 3—After heat treatment parts are quenched in tank located under elevating installation shown here at right center

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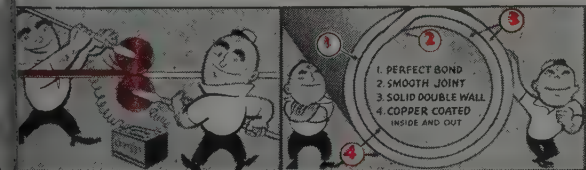
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New Principle

Developed in Thread Ring

Gage Design

By A. H. ALLEN
Detroit Editor, STEEL

RING gages, both plain and threaded, find many uses in the metalworking industry. Conventional types are of hardened tool steel, ground and lapped to size. Plain ring gages are usually of the one-piece solid construction since they can be comparatively easily finished to size and reconditioned by chromium plating.

Thread ring gages are seldom of the solid type because of the cost in making them to a fixed size, and also because of the comparatively short life of such a gage. For this reason, the so-called adjustable thread ring gage of American gage design standard has been in use for a long time and universally accepted. Engineers and inspectors, however, have recognized its shortcomings, including:

1. **Out of Roundness.** This fault is created by lapping the ring on a solid

lap, the pitch diameter of which larger or smaller than the pitch diameter of the intended gage. The ring gage thus lapped is then expanded, contracted to fit a setting plug (of furnished with the gage). This setting plug apparently fits the gage but actually has only a three-spot bearing, as may be proved by "blueing in". The result is a short gage life. Even if new gage is lapped round and to correct diameter, the first adjustment will change the circular contact into a shape approaching a triangle, as shown in exaggerated form in Fig. 3.

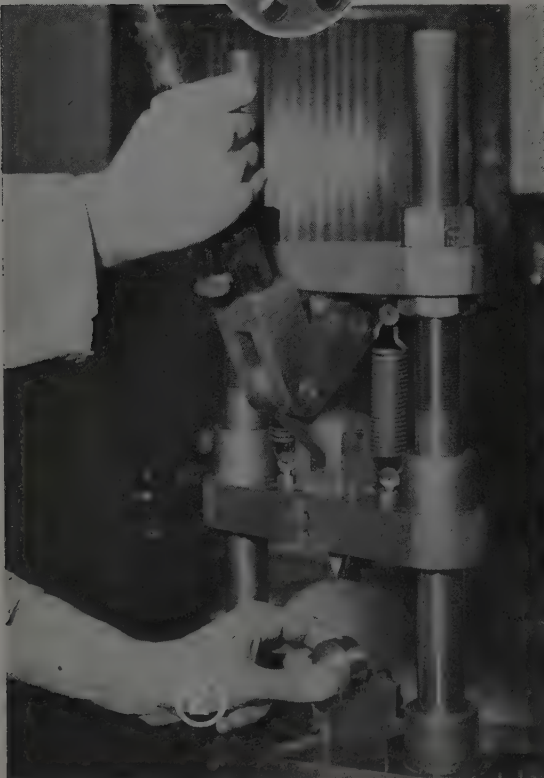
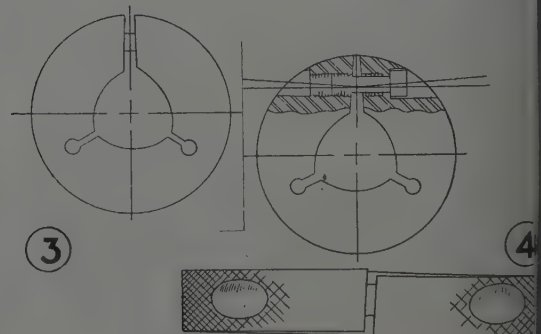
2. **Out of Plane.** The common ring gage (ACD standard) features in its adjusting device a sleeve which is

Fig. 1—Four sizes of adjustable thread ring gages, featuring tool steel gage inserts and anodically colored aluminum alloy knurled shells

Fig. 2—Coining operation on drill spot at center of adjusting slot (still to be cut) on the insert. This is done to provide pyramidal seat for adjusting screw to maintain alignment after adjustment

Fig. 3—Sketch showing in exaggerated form the tendency toward triangular contact in adjustable ring gage

Fig. 4—Sketches showing (above) tendency toward bending of sleeve around adjusting screw, and (below) out of plane conditions as adjustment is tightened; both somewhat exaggerated for purposes of illustration



ended to fit like a dowel pin in the free ends of the gage body adjacent to the "through" slot, so as to keep the ends in one plane after slotting. It has been tried to make such a "dowel pin fit" on this sleeve, with the result that the size adjustment was found to be inadequate. The only way the size adjustment will function properly is to make the sleeve fit rather loosely, as otherwise the size adjustment would require bending the sleeve, as indicated in Fig. 4.

In an effort to overcome these deficiencies, engineers of the N. A. Woodworth Co., Ferndale, Mich., worked out an entirely new principle in the design of adjustable thread ring gages. It was arrived at only after extensive experiments with many various modifications of the conventional type of ring gage, most of them using different designs of slotted and tapered inserts with concentric holes, in solid and standard shells. Each design was studied in detail from the point of view of both production and the maintenance of roundness on adjustment. One objection encountered in inserts with equispaced notches around the outer periphery was that they were a source of cracking in heat treatment. The ultimate design eliminates them altogether, and comprises four parts, as shown in Fig. 5:

1. The Insert: A tool steel bushing, slotted in one place. The inside diameter is threaded as desired. The outside diameter is eccentric with the inside diameter to such an amount that it will contract perfectly round. There is a drill spot at the center of the slot, which is coined into a pyramidal seat (section A-A in Fig. 5). Material for the bushing or insert is conventional hardened and ground tool steel of highest quality, sawed from round bar stock, machined and heat treated.

2. The Gage Body: It acts much like a hose clamp and exerts uniform radial pressure on the insert. It is drilled and slotted as shown, in order to reduce the weight to a minimum and to make it as flexible as possible, leaving in effect only a clamping band. The inside diameter is eccentric the same amount as the insert. It is slotted at the thinnest part of wall, drilled and tapped for a clamp screw at the slot, and tapped at the opposite side for an adjusting screw. Material used in the gage body is 17ST aluminum alloy, anodically colored either red or green, the former for "no go" and the latter for "go" gages.

3. Adjusting Screw: This is a hex socket type and has a special spherical dog point nose which engages the coined pyramidal seat at the slot of the insert.

4. Clamp Screw: This is a standard hex socket head type.

Accuracy of round contraction of the insert is claimed to be inherent in the design of the part itself. The insert eccentricity of outside diameter with inside diameter is maintained to a definite formula. The gage body is flexible so that it will not influence the roundness or straightness of the insert. The pyramidal seat at the slot of the insert insures alignment of the threaded inside diameter under all conditions of normal use.

One important feature of the pyramidal ball seat is that the diagonal axis of the pyramid is set to the helix angle of the thread in the insert. When the gage

is contracted the thread elements remain in alignment across the through slot. In other words, the free ends of the insert shift sidewise, as the gage is contracted, to compensate for the helix angle of the thread.

Adjustment of this new type of ring gage is simple, the only tool needed being a small socket wrench to fit the clamp screw and adjusting screw heads. The clamp screw in the gage body is always loosened first, after which the adjusting screw is positioned to give the desired diameter of the gage. The adjustment is locked by a final tightening of the clamp

(Please turn to Page 146)

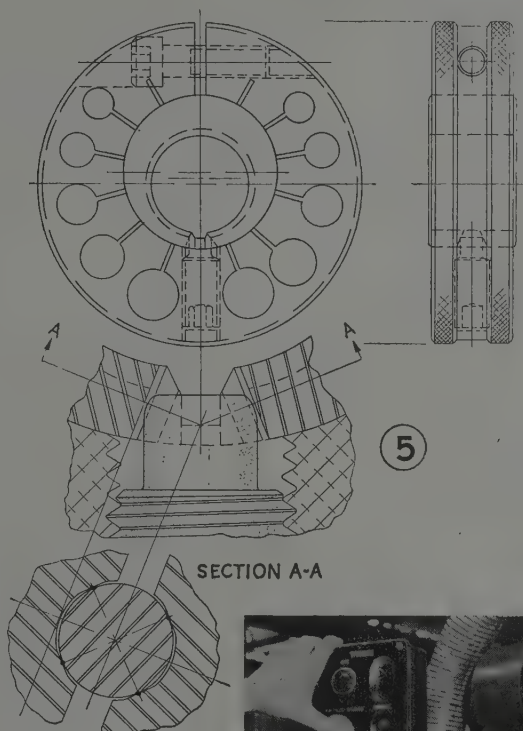
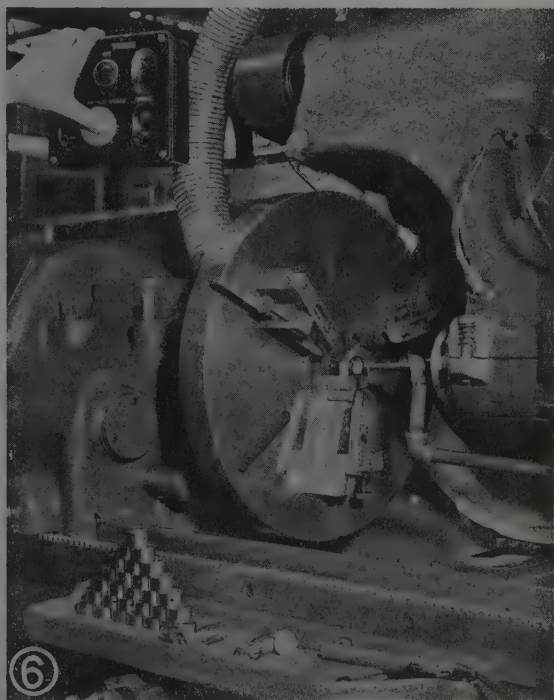


Fig. 5—Flat and edge drawings of adjustable thread ring gage with steel insert in aluminum shell. Enlarged sections show four contact points of counterlock screw. Specially shaped hole is formed in a coining press before the insert is drilled and slotted

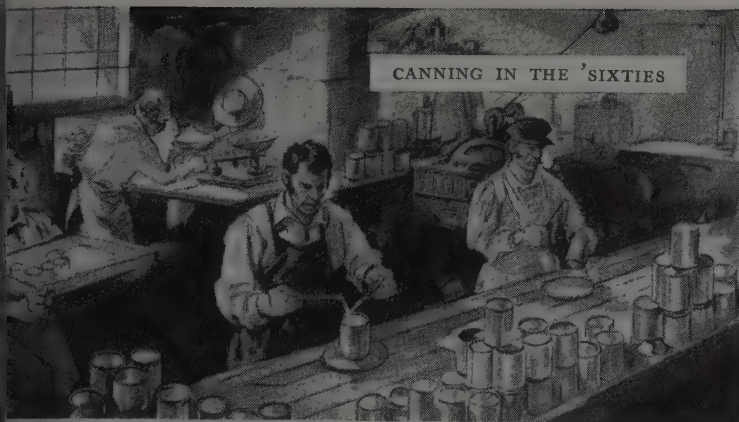
Fig. 6—Insert mounted in fixture in thread grinder, for finishing the gaging surfaces





FOOD PACKING PLANT
1946

DRAWN FOR JONES & LAUGHLIN BY J. H. MACHESON



CANNING IN THE 'SIXTIES

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CANNING

More than 3,000 packing plants are engaged in preserving the good foods conserved for future use each year in the United States. Fresh foods are canned at the peak of perfection within a few hours of harvesting. To handle them properly the modern packing plant must be efficient and spotlessly clean. Steel machines are used in the receiving, washing, sorting, grading, blanching, peeling and coring of fruits and vegetables. They are also used in filling the containers (see illustration), exhausting the air from them, sealing, processing in steam retorts, cooling, labeling, packing, warehousing and shipping.

Commercial canning 80 years ago (see sketch), used crude, heavy cans. These were hand filled and hand closed. When tin plate manufacture was introduced in America by the steel industry, fast, safe packing of foods by machinery quickly developed. Perfection of cold reduced steel strip and improvement of tin coatings gave packing industry new impetus.

Behind today's food packers are the container manufacturers, who supply the packer at the right time and in the necessary quantity. They furnish technological advice and guidance, as well as practical information on processing treatments for various products. They also carry on experimental work on new techniques. Their service men are constantly assisting the packer. Can and closure makers must be familiar with the amount of acreage planted, conditions of crops and other variables influencing the demand for containers.

60 canisters a day was best output of expert tinsmith in the 1840's, working by hand-and-foot power with iron sheets crudely coated with tin. Today, with modern tin plate a packer's can line produces 400 tin cans a minute, over 3,000 times the output of an early can maker.

Behind the can and closure makers is the tin plate industry, of which Jones & Laughlin is a part. J&L supplies the best possible tin plate in a wide variety of grades, coatings and tempers. The steel industry works with the can and closure manufacturers constantly in improving coatings and fabricating qualities of tin plate.

Tin plate is made to exacting specifications. The tin coating on the light gage cold reduced steel sheet must be evenly distributed to resist corrosion and provide a good soldering surface. The gage must be uniform in order to pass smoothly through the complicated can-making and closure machines. The temper of the sheet must be exact to form can bodies without fluting or breaking. The sheet must be ductile to "flow" readily in dies for forming and deep drawing operations. The coating must provide good surface for lacquers, enamels and lithography. These qualities are assured in J&L tin plate, by the Jones & Laughlin Controlled Quality method of manufacture.

Double Action CLEANING MACHINES

CLEANING operations on parts which have been ground and polished utilize many methods and a variety of equipment in the many plants performing this operation. Equipment used in some plants is not only very costly, but results are not always satisfactory because the polishing material is not entirely removed from the parts being cleaned.

Such has been found the case in the

plant of a company which manufactures a product built up of a number of steel stampings. These pieces are assembled and the several mating surfaces ground and polished to present a neat finished article. For this polishing operation oil or grease paste is used.

The former method of removing this paste after polishing was to wash parts with kerosene, using cloths for drying.

At best this method left a messy place, besides being a costly job.

A cleaning machine was then designed and built with an outer circular shell fastened to a table by three brackets designated as A in Fig. 1. Three forcing strips B were attached to the side of this outer shell or drum; these strips rest the inner drum shown in Fig. 2.

A bevel gear D-1 is fastened to the bottom face of drum C, driven by a smaller bevel gear D-2. The rotation is obtained from a belt and the pulleys shown at right of Figs. 2. The motion transferred to the drum is from an overhead shaft. The drum was provided with a fast and loose pulley as shown. The belt operating the fast pulley revolves drum C which revolves on the angles B.

Inside drum C another circular drum (Please turn to Page 151)

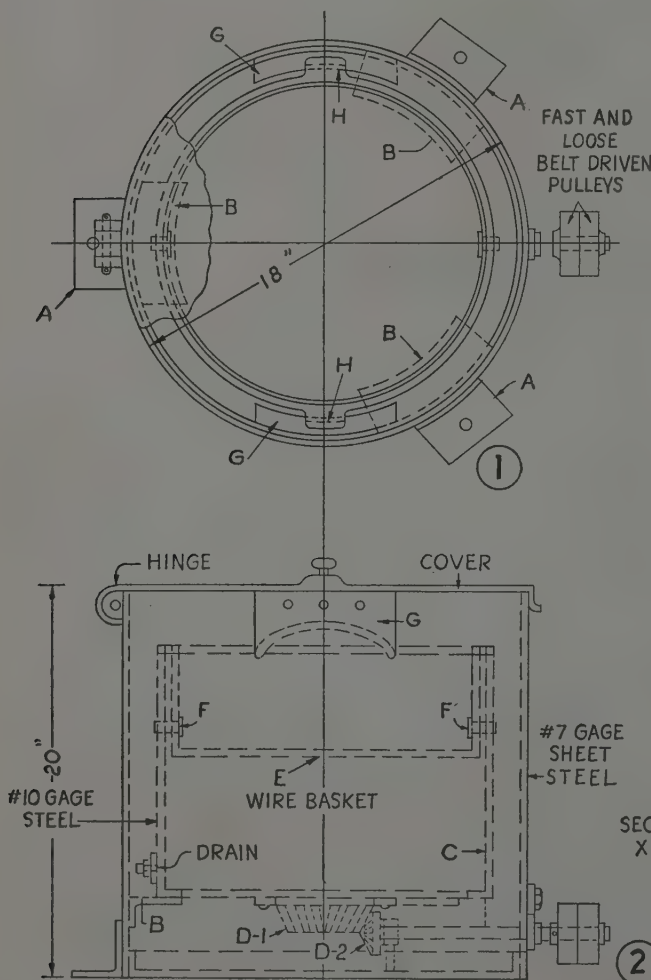
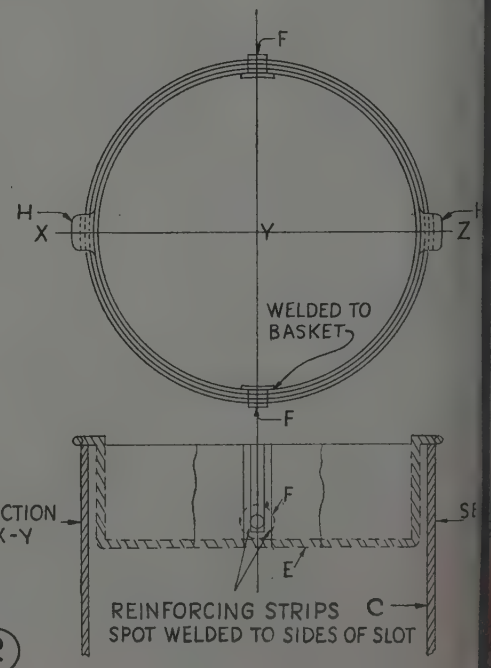


Fig. 1 — Diagram, looking down on part cleaner, showing layout of inner and outer drums and wire basket

Fig. 2—Elevated diagram showing bevel gear driving arrangement. Gears D-1 and D-2 drive drum C and basket E, cam G raising and lowering basket to clean parts

Fig. 3—Projections H on basket cause raising and lowering when passing over cams. Pins slide in slots in inner drum

Fig. 4—Arrangement of basket in inner drum



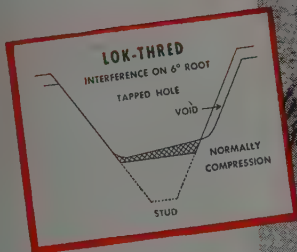
HIS STUD

locks securely

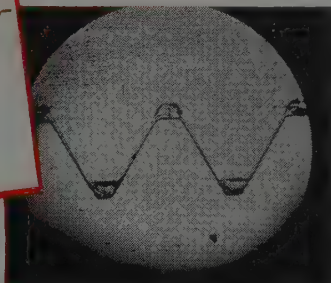
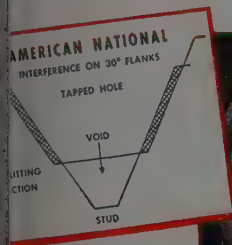
**'S THE NEW LOK-THRED
MADE BY "NATIONAL"**



Patent Pending



Photomicrograph of thread section in place in aluminum, showing how 6° root angle in Lok-Thred design absorbs the load.



Photomicrograph of conventional stud thread (oversize fit in an attempt to lock).

Here's an entirely new principle of thread design—the LOK-THRED!

In conventional threads, stresses result in shearing or stripping action borne by the thread flanks.

The LOK-THRED design puts the load on the 6° angle at the root of the thread so that stresses are carried by compression transmitted to the surrounding metal.

The LOK-THRED is especially suited to studs for use in aluminum and magnesium as well as cast iron or steel. It solves the designer's age-old headache of studs loosening under vibration or lateral motion.

FACTS ABOUT LOK-THRED

1. A modified American National thread designed to lock securely and become tighter in service.
2. Handled with standard tools.
3. Does not require selective fits.
4. Seals positively and in many cases obviates need for blind tapping and adding bosses.
5. Has much higher fatigue limit than ordinary threads.

6. Does not gall when being driven.
7. Does not fret from lateral motion.
8. Entire normal working load carried on 6° angle at root of thread.
9. Stronger in both tension and torsion than ordinary American National threads.
10. Re-usable and on any re-application one additional quarter turn brings the torque back to its original installation value.

Write for samples and full information

National
HEADED AND THREADED
PRODUCTS

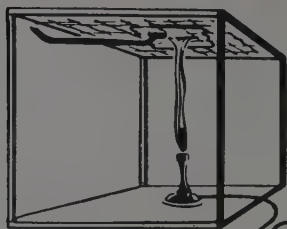
THE NATIONAL SCREW & MFG. CO., CLEVELAND 4, O.



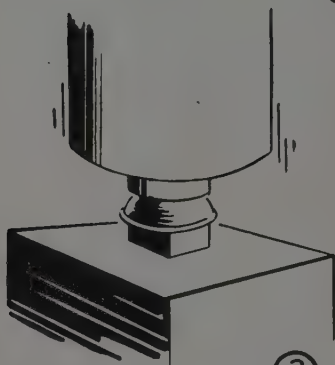
New Mineral Wool

INSULATION

STANDARD



... permits metalworking industry to order on specification basis



LATEST development in joint standardization program of the National Bureau of Standards and the Industrial Mineral Wool Institute is the release of standard CS-131-46 on testing and reporting of all forms of mineral wool insulation, widely used by both steam power plants and manufacturers of electrical heating and refrigeration equipment.

Adhesive strength, corrosion resistance, coverage and temperature resistance, in addition to the basic feature of thermal conductivity, are among tested characteristics of importance to the metalworking industry. Tests described cover all material of fibrous forms processed from molten rock, slag or glass.

Forms of industrial mineral wool for which test methods are given are blanket, block, board, felt, granulated, industrial batt, insulating cement, loose, and pipe insulation of both blanket and molded forms.

Uniform and detailed methods of testing and recording physical and chemical properties are given. The forms of industrial mineral wool are defined and formulas given for fixing the conclusive factor of each test so that standards may be made available for the judgment of characteristics and behavior by uniform

tests of any type of industrial wool.

Test for adhesive strength of cement is based on power required to separate two metal elements of prescribed size which have been bound together with a layer of insulating cement. Formula gives a result in pounds per square inch.

The test for compressive strength applies to block, board, and insulating cement, and as in the preceding gives a result in pounds per square inch of compressive strength.

Corrosion resistance is tested by types of industrial mineral wool insulating cement. It is based on effect on identical steel plates freely exposed to humidity, and the difference between specimens of wool material.

The coverage test applies to insulating cement only. The formulas express dry coverage in square feet per thick per 100 lb of cement, which change upon drying and dry density.

Density and thickness tests are listed for industrial batt, blanket and blanket-type insulation. By different methods, the same tests are made for block and board insulation and molded pipe insulation.

Fire-resistance test is made by placing a large bunsen-type burner on all wool products in order to classify materials as (1) incombustible, (2) retardant, (3) slow-burning, or (4) combustible.

Moisture adsorption tests are determined for all mineral wool products except insulating cement (which is applied to

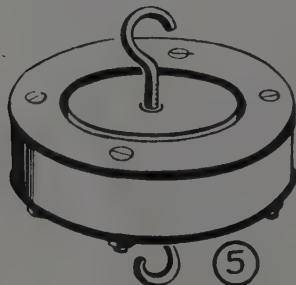
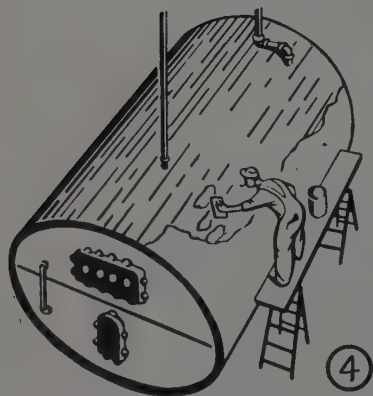


Fig. 1—Depth gage for measuring thickness

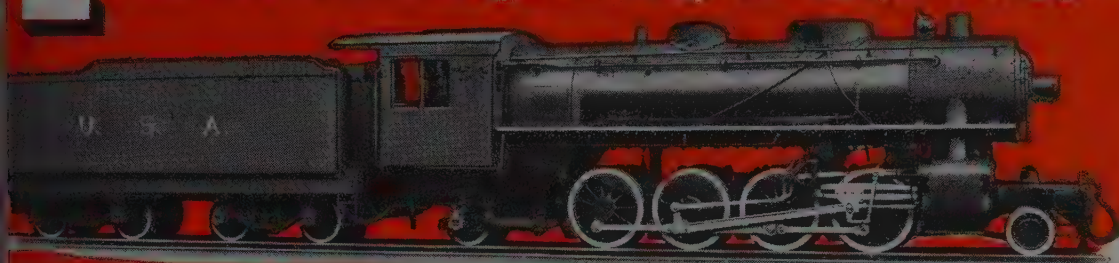
Fig. 2—Test for fire resistance

Fig. 3—Test for compressive strength

Fig. 4—Coverage test for insulating cement, important in locomotive lagging or hot-tank insulation

Fig. 5—Device for testing adhesive strength

PORTER *Steam Locomotives*



Lower Operating Costs

Less Maintenance

Greater Availability

Here are some of
the features that give PORTER
Locomotives their EXTRA
STAMINA

1. Extra-heavy frames, flame-cut from solid, heavy-section, Universal mill plate. Annealed and heat-treated after cutting.
2. Axles, crank pins, guides, rods, and other strain-bearing parts solid-forged from best quality open hearth steel.
3. Extra large bearing surfaces on all moving parts.
4. Accurate machining of all wearing and fitted surfaces.
5. Case-hardened pins and bushings at all vital parts.

PORTER
"Better Built"
Equipment
Established 1886

LOCOMOTIVE DIVISION:
Diesel, Diesel-Electric, Steam and Fireless
Steam Locomotives

AMERICAN-FORT PITT SPRING DIV.:
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equipment operated at relatively high temperatures), the results showing as percentage of adsorption by weight and by volume.

Tests for shot content (nonfibrous content) are specified for industrial batt, blanket, felt, granulated, loose, and blanket-type pipe insulation. The formula for determination of the factor expresses shot content as a percentage of weight.

Temperature resistance tests for all mineral wool products are specified. These determine the behavior of the material during, and the appearance after, protracted exposure to any specified temperatures.

Four procedures are included for determining the factor of thermal conductivity. Three alternate methods for blanket-type and molded-pipe insulation, and one test for all other industrial

mineral wool products, are described. For pipe insulation there is the choice between methods using guarded ends, calculated end losses, and calibrated end losses, and for other materials the method of the guarded hot plate. The formula in each case gives the thermal conductivity (in Btu's per hour per square foot per degree Fahrenheit and per inch thickness) for the mean temperature of the test.

Tests Based on Adopted Methods

Several of the tests established are based on methods adopted as standard by the American Society for Testing Materials. Others were worked out by the specifications committee of the Industrial Mineral Wool Institute.

This standard was promulgated in May 1944. Members of the Institute have now accepted and approved the standard

CS-131-46, the subject of this. It was issued by the National Bureau of Standards of the Department of Commerce in June of this year and contains names of scores of acceptors through the mineral wool industry. Copies of the standard are available for distribution and can be secured from the Industrial Mineral Wool Institute, 441 Lexington Avenue, New York 17.

Division of Labor Standards of the Department of Labor is offering a series of industrial safety charts which show work hazards and dangerous working conditions. It is making available a new series of charts each month—each group on a different subject. Charts may be obtained from the Superintendent of Documents, Washington, at a cost of 10¢ each or \$3.75 per 100 copies.

Zinc Coating

STRUCTURAL MEMBERS

METAL surfaces are protected from salt water corrosion for periods up to 12 years by a process utilizing a spray-applied zinc coating which is in excess of one ten-thousandth of an inch thick. Developed by Glaspray Process Co. of San Francisco, the process was recently demonstrated by applying such a coating to the structural members of the famed Golden Gate bridge after their surfaces had been grit-blasted to remove all paint and rust.

The zinc used is in powdered form, but upon application it is mixed with gas and forced by means of a specially designed spray gun (illustrated) through a flame of approximately 786°F. The flame preheats the steel base so that the zinc coating fuses itself with the steel and becomes inseparably bonded to the structural member itself.

The corrosion resistant coating was used extensively during World War II for the protection of ship's tanks. More than half a million square feet were coated in this particular operation, its first application.

The process is portable and is moved easily from job to job. Its principle equipment is the air compressing machinery. In the coating of tanks of naval vessels, the compressors were located in pairs on docks alongside the ships and the necessary grit and grit recovery tanks were located on the decks of the ships themselves, with hoses leading down into the tanks.

It was found in the development of the process that some new techniques had to be perfected and the application had to be handled by trained personnel. A special mask, seen in accompanying photograph, was designed and engineered to protect the operator's face, supplying him with pure air in a manner similar to the method used in deep sea diving. A suction hose is used to recover a large part of the grit to keep confined areas relatively clean.

The Glaspray company claims that use of the process re-



sults in a finer surface finish, permits inexpensive materials to do the work of more expensive materials and eliminates the work of rust and corrosion for greater periods of time.

While the Golden Gate bridge demonstration used zinc coating, the process also is designed for coating with lead, aluminum, brass, bronze, copper, manganese, monel, silicon, nickel, iron and chromium, as well as with glass and plastics.



No other coolant can offer

ALL 7

of these amazing
advantages:

1 Antiseptically treated . . . combating skin irritations or rancidity arising from bacterial growth.

2 Remarkable wetting and cleansing power . . . no gumming of lines or reservoirs . . . cleans up dirty machines.

3 Permanently stable emulsion with water . . . usable for longer periods.

4 Protects against rusting of work or tools.

5 Prevents blueing or burning of work . . . no "loading" of grinding wheels.

6 Longer tool life—better finish.

7 Economical, because it permits higher dilutions and has a longer usable life.

For those outstanding reasons, this self-emulsifying water-soluble coolant is being increasingly adopted by metal-working plants everywhere. Write for descriptive folder, prices and trial order. E. F. HOUGHTON & CO., 303 W. Lehigh Ave., Phila. Offices in all principal cities.

HOUGHTON'S
ANTISEP
SOLUBLE OIL

Fine-Grained Steels

(Concluded from Page 98)

additions cause a lowering of the coarsening temperature, much higher coarsening temperatures can be reached with titanium than with aluminum.

Tensile tests, shown in Table III, indicate that titanium increases yield point and tensile strength with little change in ductility. Titanium has much less effect than aluminum on notched impact resistance, see Table IV. A slight decrease in the temperature of brittle failure and a modest improvement in room-temperature resistance resulted from small additions. This is probably a grain-refining effect, as there is little improvement until the coarsening temperature is raised above the normalizing temperature. Although large additions produced a fine grain-size, they were found to be detrimental to notched impact resistance.

Mixtures of ferrosilicon zirconium and ferrosilicon were added to a series of ingots of low-silicon heat for the

zirconium grain-refinement study. The coarsening-temperature tests showed that zirconium is less effective than either aluminum or titanium as a grain refiner. The increase in coarsening temperature was not large, but it was continuous up to 0.13 per cent. It was found to cause a slight increase in yield point and decrease in ductility (Table V).

Effect On Notched Impact Resistance

Zirconium had a greater effect on notched impact resistance: Temperature of brittle failure was reduced substantially by small additions, and the room-temperature resistance was increased (Table VI). This, however, was attributed to an alloying rather than a grain-refining effect because the improvement in notched impact resistance was evident before the coarsening temperature was raised to the normalizing temperature.

Effect of titanium and aluminum used together was indicated in an aluminum series made from a heat in which enough ferroc carbon titanium was added to the

ladle to give a residual titanium content of 0.005 per cent. This heat was practically identical in composition and physical properties with the heat prescribed for the first aluminum series. The higher titanium resulted in an appreciable increase in coarsening temperature. This is shown in Fig. 2 in which the mean of the coarsening temperature after 4 hours heating is plotted against the aluminum content.

It was concluded that the three elements differ in type as well as in degree of grain-inhibiting tendency. Aluminum is most effective as a grain-growth inhibitor when 0.028 per cent, as insoluble aluminum, is present. It is difficult to reconcile this critical amount with any theory involving grain-growth inhibiting by an aluminum oxide. The simple relation between titanium content and coarsening temperature indicates that the mechanism of grain-growth inhibiting by titanium is much less complex than that of aluminum. This relationship is perfectly compatible with, though not a proof of, grain-growth inhibiting by titanium carbide. Zirconium is less effective than either aluminum or titanium as a grain refiner.

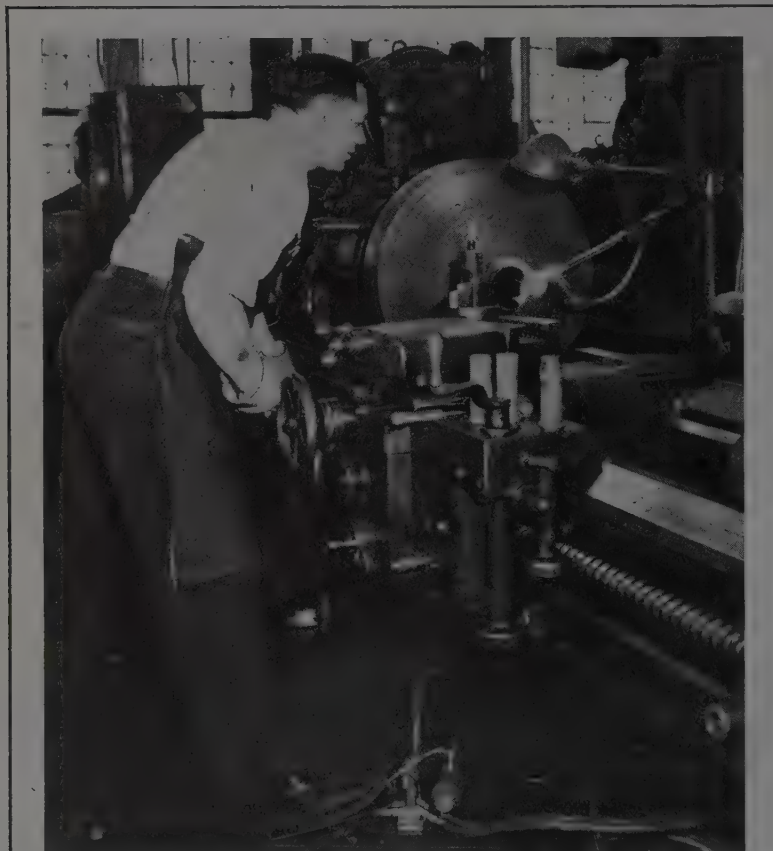
Improvement in notched impact resistance at low temperatures by use of these elements is more of a direct alloying effect than the result of grain refinement. Grain refinement does improve the notched impact resistance and is therefore difficult to distinguish from alloying and grain-refining effects. Considering the alloying effects alone, aluminum and zirconium are beneficial to low temperature impact resistance whereas titanium is detrimental.

Text on Industrial Carbon

Industrial Carbon, by C. L. Marshall, cloth, 472 pages, 6 x 9 inches; published by D. Van Nostrand Co. Inc., 250 Fifth Ave., New York, for \$7.50.

The second edition of this work has been completely rewritten to cover advances in the 17 years since the first edition, bringing the subject up to date. The first part covers the elemental forms of carbon with their applications. The second part covers the forms, which have increased enormously, and constitute the second section. Manufactured forms, artificial graphite, electrode brushes and similar forms are treated in the third part. In the fourth section are gathered analytical and testing methods applied to all forms of carbon and properties which vary widely as a function of shape, particle size and manufacturing technique.

Literature of carbon is widely scattered and the author in this work has attempted to cover the technologic applications of elemental carbon aside from its use as fuel.



SIMULTANEOUS ANNEALING: During spinning operation, work-hardened metal is annealed at the East Pittsburgh works of Westinghouse Electric Corp. by gas torch arranged near the work. Foot pedal controls flame so that the part is not burned

SPECIFIED

MAIN SPROCKET

DATE 10-13-44

MATERIAL
MEEHANITE
TYPE "GA"

HARDNESS
200-220 BRINELL

SCALE
FULL SIZE

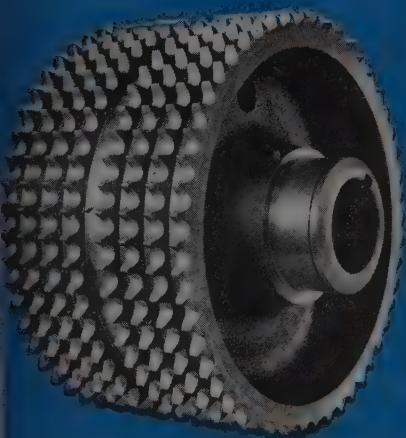
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APPROVED *Beuf*

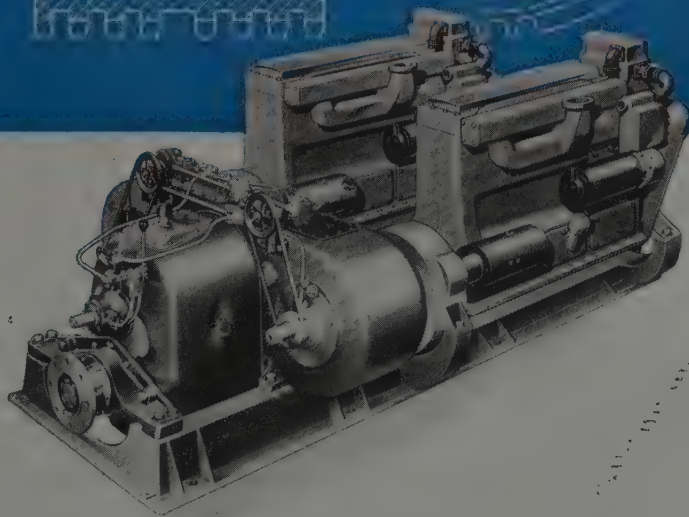
TWIN DISC CLUTCH CO.

RACINE, WISCONSIN



ABOVE: Meehanite main sprocket used in propulsion assembly.

RIGHT: Twin Disc Model ME-300 multiple engine single screw unit in which Meehanite sprockets are specified.



When designing their Model ME-300 multiple engine hydraulic drive unit for single screw marine propulsion, Twin Disc Clutch Co., Racine, Wisconsin, specified Meehanite sprockets for the roller chain drives. The importance of these sprockets from the standpoint of performance, resistance to wear, strength and toughness, is obvious in

units of this type. Meehanite meets the requirements.

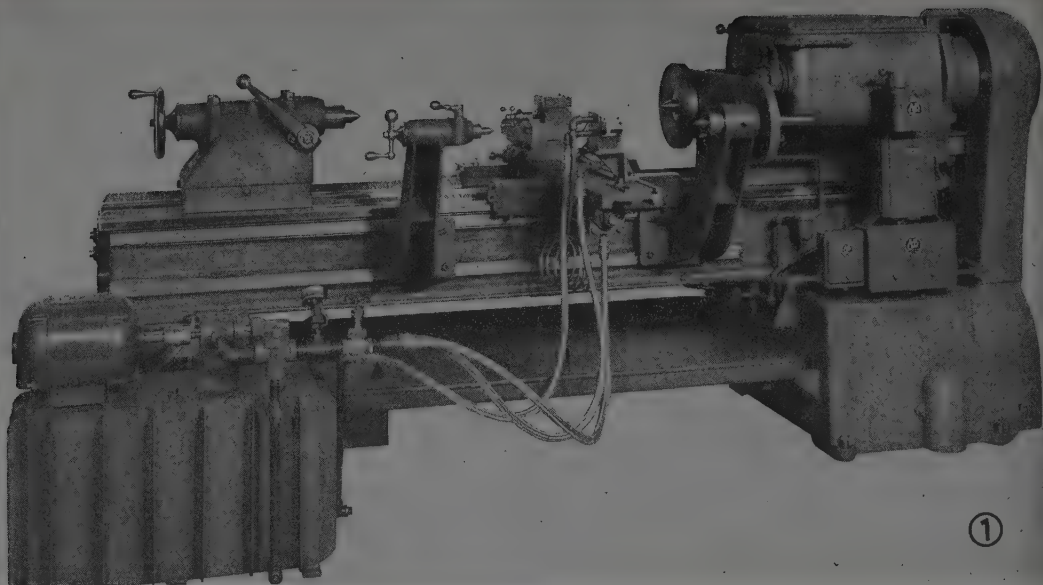
All sprockets have cut teeth and the machining of a part of this type provides tangible evidence of casting uniformity, solidity, freedom from defects and good machinability.

Write for Bulletin No. 20 entitled "Meehanite—the Metal for Wear Resisting Castings."

New 16 mm motion picture
Meehanite Means Better Castings
just released.
We will be glad to send
you a copy.

MEEHANITE

PERSHING SQUARE BUILDING, NEW ROCHELLE, N. Y.



Duplicating Complicated Forms with a **PROFILING MACHINE**

Lathe attachment uses any type of template to reproduce any job from bottle molds to complicated cam forms

A HYDRAULIC profiling and duplicating machine capable of reproducing any job from bottle molds to complicated cam forms has been developed by Springfield Machine Tool Co., Springfield, O. Shown attached to a 20 in. medium duty lathe on an 8 ft bed, Fig. 1, it will make either interior or exterior duplications.

Any type template may be used with the machine—a round type rotated between centers at rear of machine, a flat template held stationary between centers, or a formed flat template mounted directly on either one of two brackets, which are adjustable on ma-

chined and hand-scraped ways on rear of lathe bed. Templates requiring rotation are driven by an adjustable chain drive directly off spindle, mechanism which is guarded by a metal guard.

Three levers on front of headstock provide twelve spindle speeds. A 2-sp motor will further reduce speeds to low as 5 to 6 rpm, when required.

Most of the duplicating mechanism is on the cross slide which is designed to overhang rear of bed enough to mount stylus control valve on top of slide. Valves swivel to accommodate various contour

(Please turn to Page 150)

Fig. 1—Rear view of lathe with profiling machine attached, showing adjustable brackets attached on machined ways on rear of lathe. At extreme left is hydraulic pump unit

Fig. 2—Close-up of profile machine showing stylus following contour of bottle mold in background and duplicate mold being cut in the foreground parallel to machine spindle

Fig. 3—Contour cam turning using a revolving flat thin sheet metal template

Fig. 4—Duplicating mechanism arranged to work at right angles to spindle. Note hydraulic cylinder parallel to lathe bed

Hot-Dip

Galvanizing Practice

WILLIAM H. SPOWERS JR.

President

Spowers Research Laboratories Inc.
New York

A Permanent Galvanizing Kettle

EVER since the beginning of galvanizing the zinc container has been made of steel. Attempts were made to use cast iron for small installations but the results were unsatisfactory. Cast iron was found to be too soft and dissolved into the molten zinc too rapidly with a resulting high dross loss.

For many years the reverse flange type of kettle was the standard method of fabrication. This method of construction, however, was difficult and required flanging machines of tremendous power. Reference to Fig. 14 shows standard reverse-flanged kettle with the bottom and ends of one piece and flanged outwardly. The rivet holes are drilled rather than punched through the flanges. In this construction the bottom and end plate is made of 1-in. flange steel.

The design of this kettle was based on the theory that inasmuch as no heat is applied to the bottom or ends little deterioration was evidenced there. This is correct, for in many reverse flange-type kettles as many as three or four pairs of side plates were used on the bottom and end plate. The possibility of this procedure was due to the fact that heat was forced through the side plates and none through the bottom and ends.

Inasmuch as the flanges are formed outward for the reception of the side plates, one of the rivets come in contact with the molten zinc. These side plates usually are made of highgrade firebox steel be-

cause of the denseness of the material and its ability to better withstand the attack of the molten zinc.

Kettles of this type up to 42 ft long have been installed and have given excellent service under continuous operation for many years.

Many attempts were made to use welded kettles but not with any success until the advent of the coated welding rod. Development of the coated welding rod brought into general use the welded galvanizing kettle shown in Fig. 13. Its serviceability has been recognized for some years and it is now accepted universally. The side plates of these kettles through which the heat is forced are usually made of 1½-in. stock although many are built as thick as 2 in.

Deterioration of galvanizing kettles is

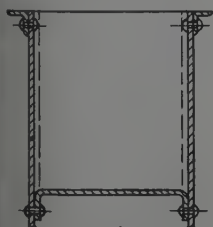
caused by the dissolving away of the inner surface of the side plates; little or no erosion occurs on the outer surface of the plate. This is due to the fact that steel is electropositive to zinc and when heat is placed on one side of a steel plate and molten zinc on the other the steel slowly but surely goes into solution in the zinc. By the same token the dissolved steel forms large quantities of dross.

The use of a steel container or molten zinc is fundamentally wrong. During the refining process considerable care is exercised to eliminate all possibility of iron or steel coming in contact with the ore or the zinc. And yet the wire galvanizer who pays a premium for high-grade zinc melts this costly material in a steel container where it becomes

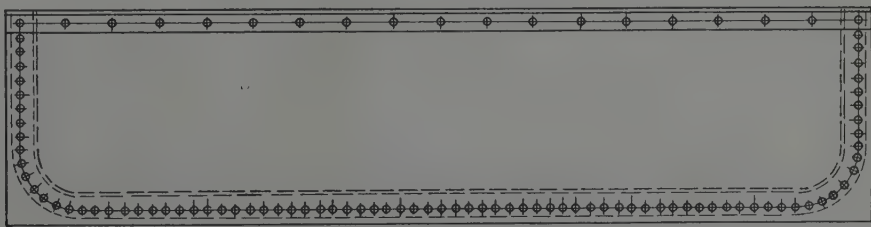
Fig. 13 (right) — Welded galvanizing kettle, 25 x 4 x 4 ft. Bottom and sides are formed of one plate of 1½-in. special firebox steel. Steel angles, 4 x 4 x ¾-in., are riveted to the sides and ends at the top with rivets countersunk and driven flat on inside of kettle



Fig. 14 (below) — Standard reverse-flanged galvanizing kettle with the bottom and ends made of one piece and flanged outwardly



Cross-section



Side Elevation

contaminated with iron and forms dross.

Furthermore, the use of steel kettles has greatly restricted the temperature range at which the equipment may be operated. Deterioration charts of galvanizing kettles show a slow rise up to approximately 880° F. At this point the chart line goes abruptly upward and at 900° F is practically vertical; any continued operation above 890° F will result in rapid failure of the kettle.

In many cases, telephone wire for instance, the ability to maintain a zinc temperature of 900 to 1000° F would be of inestimable value, but even with the latest type of furnace design the use of steel in the kettle prevents the possi-

bility of any such operating temperatures.

Many costly experiments have been conducted in an effort to find a satisfactory material for galvanizing kettles. Various settings were tried with many types of refractories. Finally it was found that one special grade of borosilicate when fused to the inside of the kettle would stand the attack of the molten zinc under indefinite operating conditions.

Laboratory cups were made from steel and this lining was fused on the inner surface. These cups were filled with zinc and held molten at 900° F all day and frozen at night (something that is never

done in actual practice) for almost a year with absolutely no deterioration of the lining or the steel cups. Furthermore, *no dross was formed*.

The success of this material was apparent that a semicommercial kettle was then built 4 ft long, 18 in. wide and 18 in. deep. This was filled with zinc and maintained for months at a temperature of 1000° F and over, with complete success. The first commercial installation made is shown in Figs. 15 and 16.

Another remarkable feature of this lining material is its toughness and pliability. A kettle of this type 24 ft long, 45 in. wide and 40 in. deep recently was installed in a large wire plant and operating on special grades of wire at temperatures ranging from 900 to 1000° F.

(To be continued)



Fig. 15 (left)—End and side views of modern galvanizing kettle which is lined with a fused-in vitreous coating thoroughly resistant to molten zinc

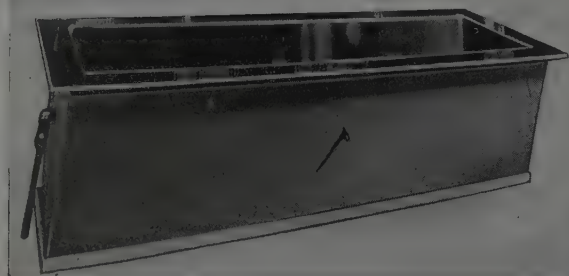


Fig. 16 (below)—Modern gas-fired galvanizing kettle built with a permanent fused-in lining



Accurate Screw Machine Cams Made from Meehanite

Instrument Parts Corp., Ossining, N. Y., manufacturers of tiny, fully machined precision parts for such instruments as watches, found that the cams on its screw machines—the “brains” of the machine—function best when made of Meehanite. An investigation proved them to give increased service life and maintain accuracy, the company stated.

The cams used rotated on a shaft of a screw machine. Thus, any inaccuracy, even as small as 0.001-in., would show up in the finished product.

Tests conducted by the company showed that heat treated and hardened

Meehanite cams lasted 200 hours in one operation. A nonhardened cam lasted 60 hours, while a cam of conventional material lasted for the short period of 30 hours.

Heat Treating Principles Discussed in New Booklet

Presentation of the fundamentals of heat treatment, prepared by the Research and Technology department, Carnegie-Illinois Steel Corp., subsidiary of United States Steel Corp., Pittsburgh, is of interest to younger metallurgists and to heat treaters, production engineers and designers.

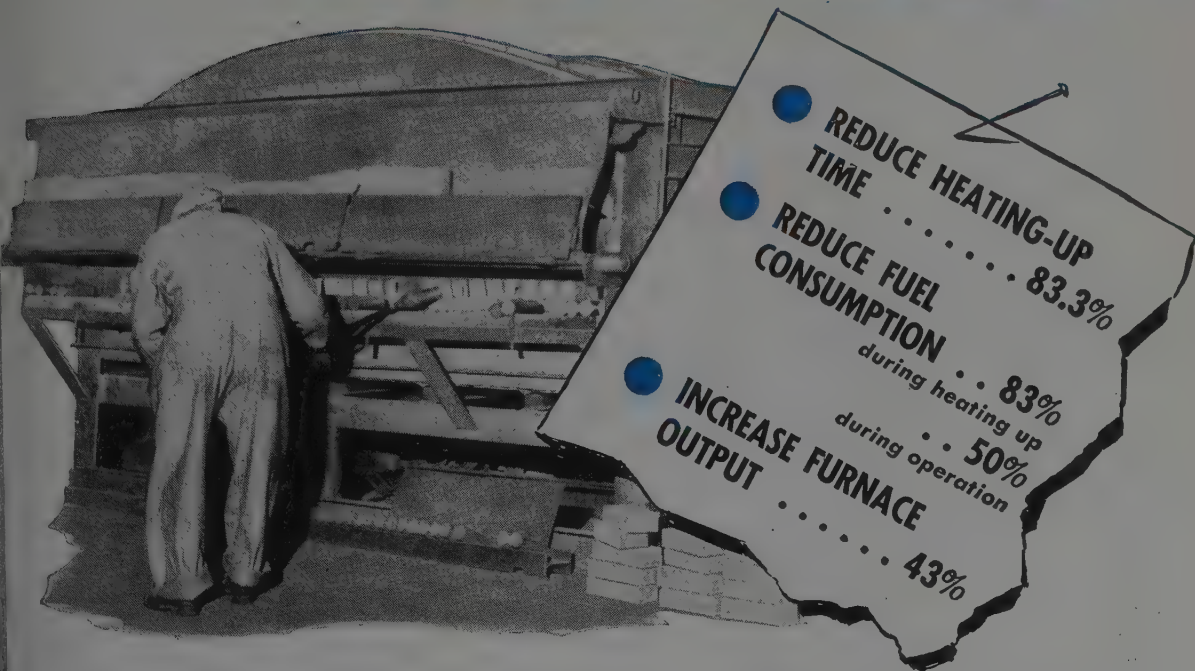
Entitled “Suiting the Heat Treatment

to the Job”, this 2-color, 8½ x 11 wire-bound 54 page booklet, illustrated with charts, diagrams and photographs, devotes 26 pages to factors concerning hardness, including heating, pearlite, nitriding, martensite S-curves, hardenability and quenching.

Next 26 pages relate to toughening, covering such factors as tempering, stress relieving, piece, notch-bar, austempering, stresses and cracking. Six fundamental elements summarize detailed explanations. Table of Jominy end quench distances versus bar diameters for six different quench conditions concludes this heat treating booklet.

Copies are available from any office of U. S. Steel or its subsidiaries.

Comparative Forge Furnace Tests Prove that **B&W INSULATING FIREBRICK . . .**



River Valley Forge Company, one of the leading forging plants in the country, ran comparative tests to determine the most efficient, economical refractory for its forge furnaces.

Two identical furnaces were used—one lined with standard heavy duty firebrick, and the other with B&W Insulating Firebrick. Superior operating efficiency of B&W I.F.B. was proved by these outstanding results:

	STANDARD FIREBRICK	B&W INSULATING FIREBRICK
Furnace Output	70 pieces per hr.	100 pieces per hr.
Heating-Up Time	3 1/2 hours	35 minutes
Cycle Time	50 minutes	30 minutes
Fuel Consumption During Heating-up		reduced 83%
Fuel Consumption During Operation		reduced 50%

As a result of these tests, River Valley Forge Company lined all of its furnaces with B&W Insulating Firebrick, thereby increasing the capacity of all forging units—reducing production costs—insuring more uniform forgings through better control.

This case history is typical of the advantages to be obtained from B&W Refractories in every type of industrial furnace. Your local B&W Refractories Engineer will gladly explain how a complete installation of B&W Refractories can increase over-all operating efficiency in your plant. Call on him at any time.



Water-Tube Boilers, for Stationary Power Plants, for Marine Service . . . Water-Cooled Furnaces . . . Superheaters . . . Economizers . . . Air Heaters . . . Pulverized-Coal Equipment . . . Chain-Grate Stokers . . . Oil, Gas and Multifuel Burners . . . Seamless and Welded Tubes and Pipe . . . Refractories . . . Process Equipment.

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 85 LIBERTY ST., NEW YORK 6, N.Y.
WORKS: AUGUSTA, GA.

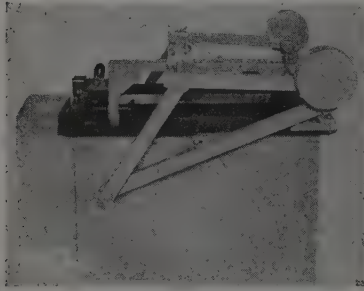
R-233

Industrial Equipment

Barrel Plater

Lasalco Inc., St. Louis, is introducing a barrel plater in which loading and unloading are facilitated by a counterbalancing arrangement that automatically places cylinder in correct position, making loading trays unnecessary.

Other features are a switch type negative contact which is made automatically



when cylinder is loaded into tank and an insulated negative connection through hollow hub of cylinder which prevents interference while loading or unloading. Plater is arranged for three speeds, has a ½-hp motor, a 10 x 18 in. hard rubber cylinder with an 8 qt or 30 lb capacity.

It is offered with steel tank for cyanide solutions or rubber-lined tank for nickel solutions.

Steel 9/2/46; Item No. 9530

Milling Machine

Cincinnati Milling Machine Co., Cincinnati, is announcing universal and plain knee-type horizontal spindle milling machines with exceptionally wide speed and feed ratios designed to cover the latest requirements for all types of milling operations encountered in metal working industries. Machines feature 16 spindle speeds ranging from 25 to 1500 rpm and a crank-operated hydraulic selector valve is employed to shift gears hydraulically.

A mechanical spindle reverse exerts no effect upon the direction of feeds. Feed rates can be varied from ¼ to 30 ipm. Spindle runs on three bearings, ball and roller. Extra metal on bull gear produces flywheel effect which is of great importance with carbide tooling. Main drive clutch is a single disk dry-plate unit.

Vertical feed screw has its own lubricating system. Parts within column are automatically lubricated and table ways and

saddle parts are lubricated by a manual pressure system. Coolant system is completely enclosed in the columns of machines.

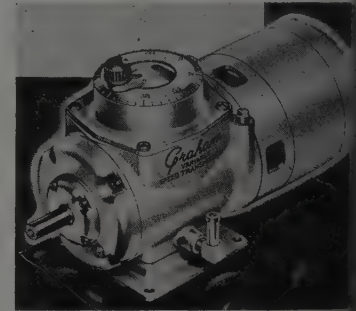
Feed controls are independent of each other, and each feed lever has a forward, neutral and reverse position. Cross and vertical hand cranks are automatically disengaged when their respective power feed lever is engaged.

Steel 9/2/46; Item No. 9740

Variable Speed Drive

Graham Transmissions Inc., 3754 North Holton street, Milwaukee 12, announces two new variable speed drive models which are compact and light in weight.

One of these, model 15, is for motor up to ½-hp. The other, model 40, is



motors from ¼ to ¾-hp. Both units may be had with or without built-in motor and with built-in parallel spur or right angle worm gearing in a wide variety of controls.

Steel 9/2/46; Item No. 9505

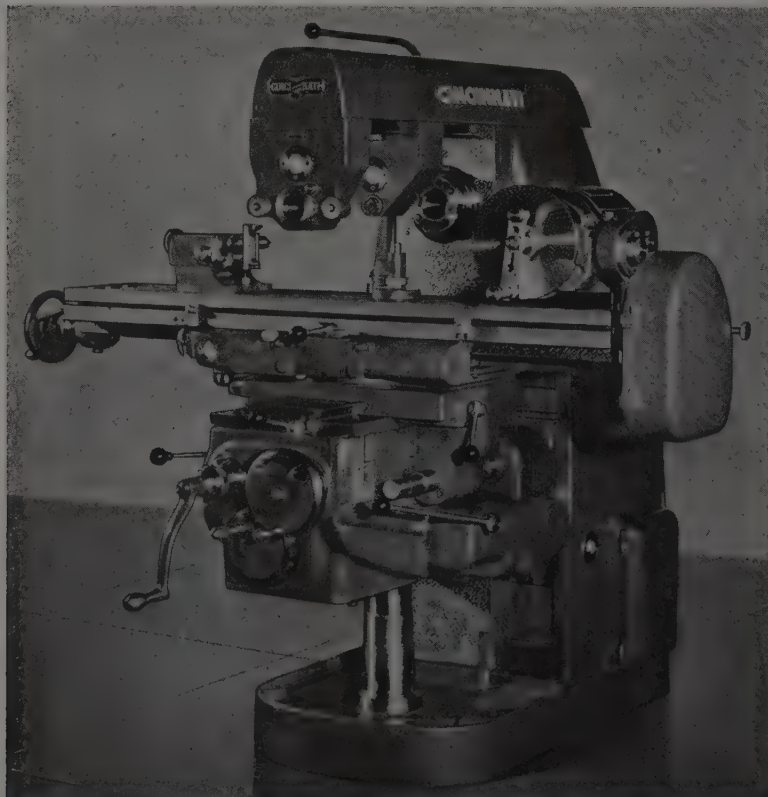
Tachometer

O. Zernickow Co., 15 Park Row, New York 7, announces a line of hand tachometers capable of registering from 100 to 48,000 rpm. Made in three models



each of which covers a different speed range, they are accurate to one-half of one per cent.

Instruments are unaffected by



(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 132.)

AT LUKENS STEEL COMPANY

84 Overhead Cranes Equipped with

ALEMITE LUBROMETER

CENTRALIZED LUBRICATION SYSTEMS

Says Lukens Steel Company, "The installation of Alemite LubroMeter Systems on 84 overhead cranes eliminated human error, increased the safety of oilers and reduced lubrication time from 1½ hours to 10 minutes per crane."

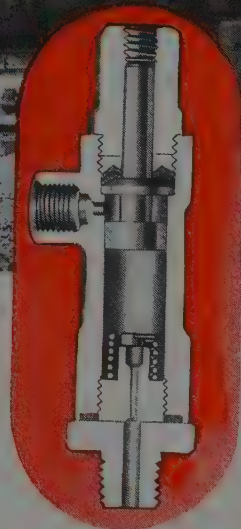
Alemite LubroMeter System is a line terminating system with the valves mounted directly in the bearing. It handles grease or oil and is extremely economical in initial cost, installation and operation.

adaptable to practically every type of light and heavy machine used in the industry. Cranes, straighteners, tapers, shears, blast furnaces, blooming, structural mills, rolling mills, leveling, etc. And the LubroMeter System can be installed for manual or automatic lubrication on present equipment, or built

into new machines as original equipment.

There Are 4 Alemite Systems

... the LubroMeter and 3 other types. Have an Alemite Lubrication Specialist demonstrate one or all four Systems right at your desk with transparent working models. Call the Alemite Distributor nearest you, or write Alemite, 1879 Diversey Parkway, Chicago 14, Illinois.



Alemite LubroMeter Feeder Valve

Fully hydraulic • Only 2 moving parts • Indicator on each valve • Lubricant delivery easily adjustable • Valve is of heavy duty construction with hardened steel piston. Available in a variety of sizes and types.



ALEMITE

Alemite ALONE Combines all 3 in Lubrication

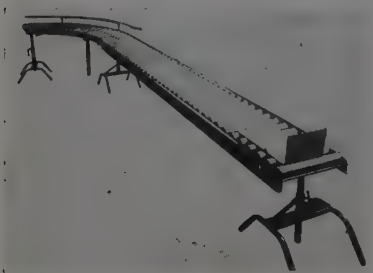
1. EQUIPMENT 2. PROCEDURES 3. LUBRICANTS

tricity, magnetism, temperature changes, or moisture and can be used in any position. They indicate right or left revolutions per minute, surface speeds in feet per minute, speed variations occurring during a fraction of a revolution and belt slipping.

Steel 9/2/46; Item No. 9500

Gravity Conveyor

Manufacture of the Rapid-Roller conveyor is announced by Rapids-Standard Co. Inc., Grand Rapids, Mich. It handles



various types of irregular surfaced material such as kegs, cartons, crates, boxes, steel bars or long and narrow pieces of light lumber swiftly and easily.

Two standard frame lengths of 5 and 10 ft in two standard widths of 12 and 18 in. are offered. Formed of 16-gage steel, rollers are 2 in. in diameter, projecting 3/8-in. above the conveyor frame level, and are mounted on radial ball bearings at each end. Rollers are spaced at 3 in. intervals, but sections can be obtained in spacings of 6, 9 or 12 in. or any other multiple of the number three.

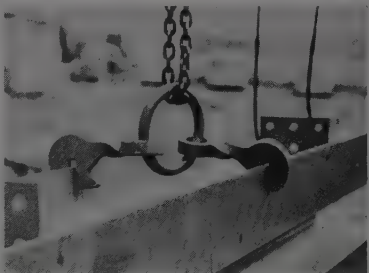
Conveyor capacity is 80 to 100 lb per foot of distributed load or 800 to 1000 lb distributed load per 10 ft section. Free movement of materials on

turns is made possible with double lane curves (in the 18 in. width).

Steel 9/2/46; Item No. 9513

Torque Hook

The Diamond torque hook, for lifting such structural steel shapes as beams, girders and channels, is a product of Elizabeth Iron Works, Green Lane, Eliza-



beth, N. J. This one-operational lifting device, applies principle of torque-action—as load becomes greater so does grip of hook.

Style 6-20 will lift beams 6 to 20 in. wide, channels 6 to 18 in., plates 1/4 to 3/4-in. thick—its total weight capacity being 7000 lb. Style 12-12 will handle beams of from 12 to 30 in. wide, plates 3/4 to 1 1/4-in. thick and lift 10,000 lb.

Steel 9/2/46; Item No. 9458

Electric Meter

Marion Electrical Instrument Co., Manchester, N. H., announces a new instrument designed to permit user to assemble an instrument to be used as a voltmeter, milliammeter, low and high resistance ohmmeter, for alternating-current and decibel meter. Offered in three sizes, each of which is interchangeable electrically, instrument has a basic sensitivity of 400

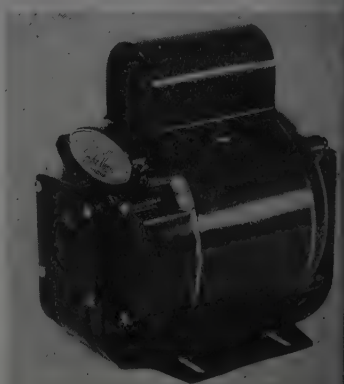
microamperes and an internal resistance of 500 ohms, plus or minus 1 per cent.

Ranges include 0 to 250 v ac-dc, to 500 ohms and minus 10 megohms, at minus 10 to plus 14 decibels. By use proper multiplier voltmeter scale can be used as 0 to 1000 v.

Steel 9/2/46; Item No. 9370

Induction Motors

Fractional horsepower induction motors with die-cast aluminum end bells keeping bearing temperatures low latest products of Jack & Heintz Precision Industries Inc., Cleveland 1. Offered 1725 rpm, ratings are 1/8, 1/4 1/3 and



1/2-hp, and all are constant speed, continuous duty, single phase, 60 cycle, 115 volt motors.

Designated as Type C-2, motors built in two styles, normal and general purpose. Former is for applications which do not require high performance, heavy duty characteristics of general purpose design. Latter type has high starting torque, low starting current and maximum running torque in excess of 300 per cent

FOR MORE INFORMATION

on the new products and equipment mentioned in this section, fill in this form and return to us. It will receive prompt attention.

Circle numbers below corresponding to those of items in which you are interested:

9530

9740

9505

9500

9513

9458

9370

9456

9503

9516

9471

9360

9527

9573

9506

9534

9501

9-2-46

NAME.....

TITLE.....

COMPANY.....

PRODUCTS MADE.....

STREET.....

CITY and ZONE.....

STATE.....

Mail to: STEEL, Engineering Dept.—1213 West Third St., Cleveland 13, Ohio

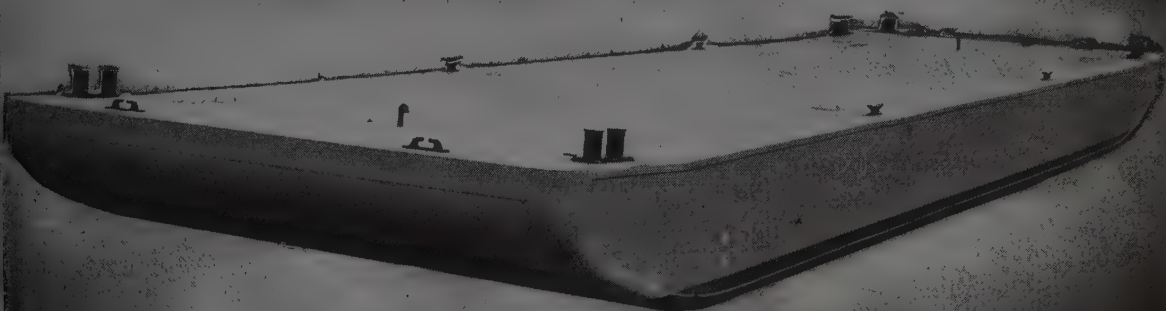
(All claims are those of respective manufacturers; for additional information fill in and return the coupon on this page.)

132

STEEL

BARGES

for every purpose



Liquid—dry cargo—drilling rigs—derricks. Look over our stock designs—or let our engineers design a barge to suit your particular needs.

Pictured here is an all-purpose barge to meet post-war requirements. It can be used for either deck or liquid cargo. Notice the long, plated rake—for swifter, easier towing. Dimensions: 110' x 30' x 7'. Capacity: 450 tons of deck or 3,200 barrels of liquid cargo.

AVONDALE MARINEWAYS, INC.

STEEL

TELEPHONE: OFFICE AND PLANT, WALNUT, 8970

RIVER FRONT, NEW ORLEANS DISTRICT, WESTWEGO, LOUISIANA

of full load torque of the induction motor

All motors have pressure cast aluminum rotor winding, snap-action starting switch and steel backed babbitt lined diamond bored bearings with oil grooves to distribute oil over entire bearing length.

Steel 9/2/46; Item No. 9456

Hole Gage

A model 1203 P-1 dial indicator gage for extremely small holes is being marketed by Federal Products Corp., 114 Eddy street, Providence, R. I. It gages holes as small as 0.122-in. and up to 0.250-in. It will also gage these small



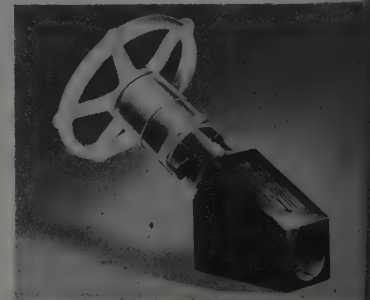
holes up to depths as great as 2¼-in. Variations within the range are obtained by use of a set of twelve interchangeable gaging plugs.

Gage is calibrated and set for any specified inside diameter to reveal condition of holes up to a total range of plus or minus 0.004-in. The minimum graduation is 0.0001-in.

Steel 9/2/46; Item No. 9503

Globe Valve

Extreme 30 degree valve body design in globe pattern effects a minimum change in direction of flow in the new valve designed by Grove Regulator Co., 65th and Hollis streets, Oakland, Calif. Tur-



bulence is almost entirely eliminated expansion takes place into downstream line after flow has passed through valve

A one piece stem and plug effects

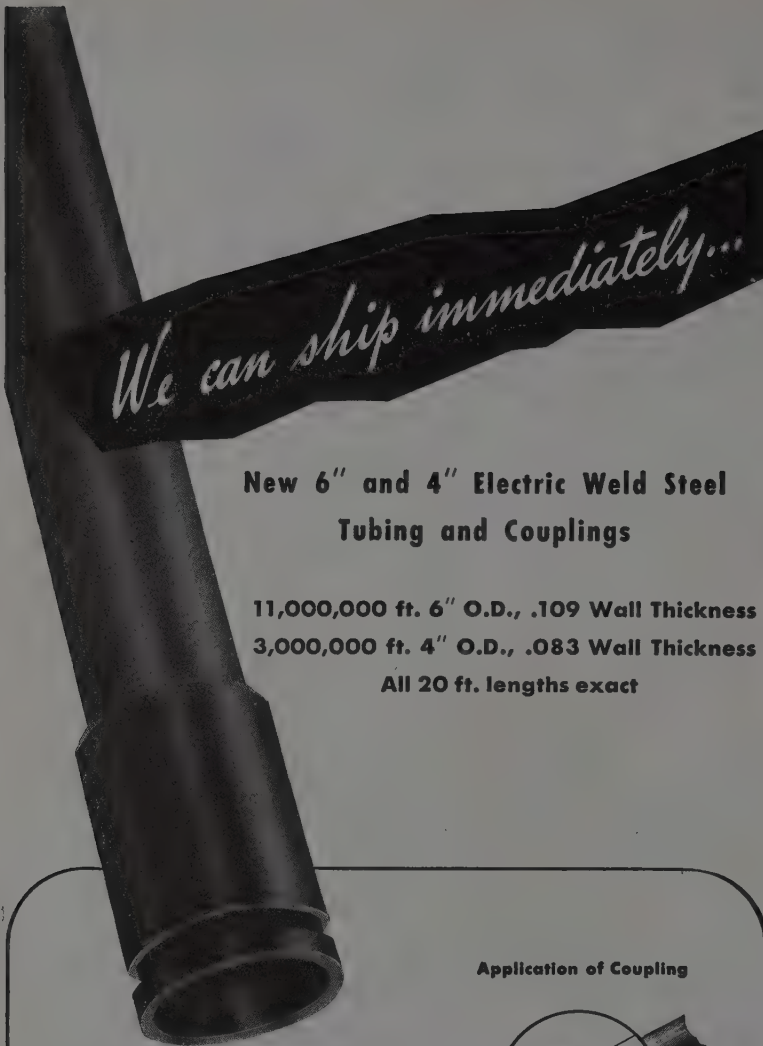
We can ship immediately...

New 6" and 4" Electric Weld Steel Tubing and Couplings

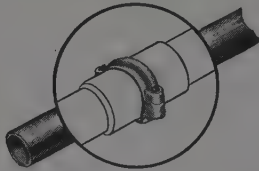
11,000,000 ft. 6" O.D., .109 Wall Thickness

3,000,000 ft. 4" O.D., .083 Wall Thickness

All 20 ft. lengths exact



Application of Coupling



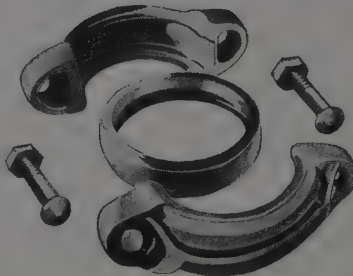
This tubing is new, excellent and has been hydrostatically tested to 900 pound pressure p.s.i. Every 20 foot length of tubing has welded on each end a 6" (6½" O.D.) or 4" (4½" O.D.) pipe nipple which is grooved for use with Victaulic type coupling.

This tubing is recommended for normal use and application on steam, oil, gas and water lines, for columns and other structural purposes.

Prompt shipments can be made from various locations throughout Ohio, Pennsylvania, New York, New Jersey, Illinois, Missouri and Virginia.

Prices will be submitted upon application, and special arrangements are available to jobbers.

Representative samples of both sizes of couplings and tubing may be inspected at our various warehouses.

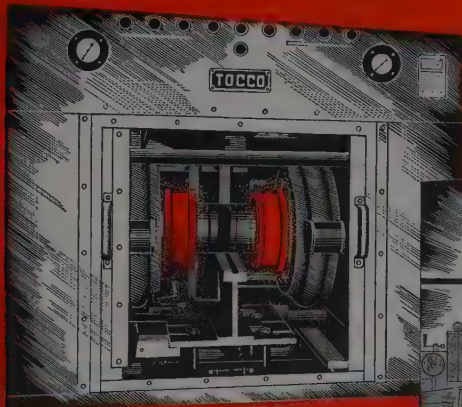


Coupling Detail

Albert Pipe Supply Company
Berry & North 13th Street
Brooklyn 11, New York
Phone Evergreen 7-8100

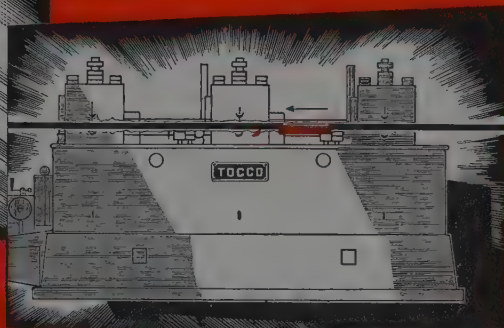
L. B. Foster Company
P.O. Box 1647
Pittsburgh 30, Pa.
Walnut 3300

Albert & Davidson Pipe Corp.
2nd Avenue—50th, 51st Street
Brooklyn 32, New York
Phone Windsor 9-6300

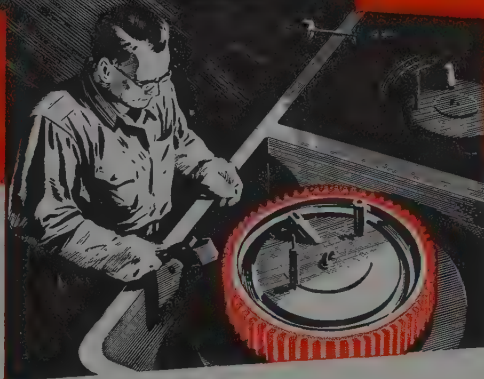


"JOB B." Bar stock, 1" diam., SAE 1045 steel. Heat treat uniformly to 30-31 R.C. Special TOCCO machine does this and produces straight, scale-free stock at 50% cost saving.

"JOB A." Tractor roller assembly. Harden rim surfaces and shrink-fit rollers on shaft simultaneously. Special TOCCO machine does this. Total heating time, 2 1/4 min.



"JOB C." 272-lb. tractor gear. Harden and eliminate need for scarce alloys. Special TOCCO machine does this . . . permits use of plain carbon steel. Saves 144,000 lbs. nickel per year.



THE ANSWER TO *special problems* IN INDUCTION HEATING

PROBLEM: "My application is *special*. How can I get Induction Heating equipment to match my job *exactly*?"

ANSWER: Call in the TOCCO Engineer. He can give you an unbiased analysis of your problem and prescribe special equipment to match your job exactly because he is backed by: *The TOCCO Development Laboratory*—largest of its kind in the world. Completely equipped and expertly staffed, this Laboratory finds the answer to hundreds of unique problems . . . and develops *special* TOCCO machines to match the job accurately (such as "A", "B", "C", above).

Remember, too, that the TOCCO Engineer can solve the "standard" problems quickly and accurately because he has available:

The world's most complete line of Induction Heating Equipment—standard TOCCO models, including motor-generator and electronic tube types of machines. One of these units with proper TOCCO fixture provides the correct answer for average applications.

Take advantage of these features of TOCCO Leadership to assure the fullest benefits from Induction Heating. The TOCCO Laboratory is described fully in the 20-page brochure, "Research for Results." Mail the coupon.

THE OHIO CRANKSHAFT COMPANY



TOCCO

—MAIL COUPON FOR BOOKLET—

The Ohio Crankshaft Co.
Dept. S, Cleveland 1, Ohio

Send free copy "Research for Results"

Name.....

Company.....

Address.....

City.....Zone.....State.....

tight shut-off when closed. Valve stem is not directly carried by handwheel, removing possibility of stem distortion.

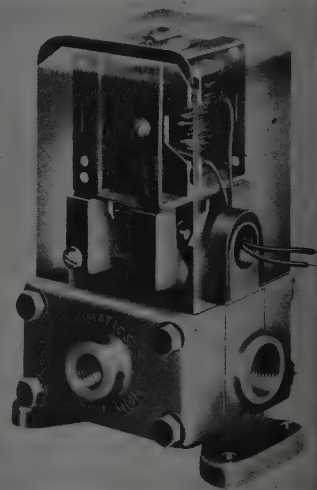
Factory sealed lubrication is zone away from flow stream and isolated from temperature effects. All threaded surfaces and operating parts are protected from paint, dirt and damage by an encasing cap shield.

Steel 9/2/46; Item No. 9516

Three-Way Valve

A solenoid-controlled 3-way valve for compressed air, announced by Numatic Milford, Mich., is designed to eliminate pounding action. Its plunger travels on a short distance—a maximum of only 7/64-in.

Exhaust port of valve is one pipe-size larger than supply and outlet, providing



rapid dissipation of exhaust air. Its solenoid draws less than 3 amp on 115-volt, 60-cycle current.

Setup desired may be selected by reversing supply and outlet manifolds on center body—making it open to exhaust and closed to pressure, or open to pressure and closed to exhaust, with solenoid energized or de-energized.

Valve is made in 6 sizes from 1/4 to 1 1/4-in. to handle operating pressures to 150 lb.

Steel 9/2/46; Item No. 9471

Machine Vise

A machine vise for use with mill and other machines having a flat top surface with T slots is being manufactured by Porterfield Mfg. Co., 749 E. Fifteenth street, Los Angeles. This Milpal vise utilizes 90 per cent of longitudinal capacity and can be adjusted from zero to maximum of flat top surface.

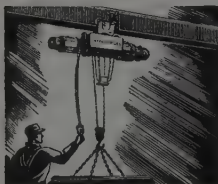
It does not incorporate usual ho-



BUILT FOR TOUGH JOBS!

- The invisible strength of this mighty giant lifts and places heavy loads at your command.

The rugged construction of Shepard Niles Single Beam Cranes assures added handling economy resulting in extra value in terms of production economy. Shepard Niles Cranes are made tough and durable to give long, dependable service. They are made in many types, capacities and spans to fit your particular need.



To meet competitive production schedules—to maintain smooth-flowing production lines, material handling equipment must stand up under severe operating conditions. You'll get capacity load-handling, long efficient service at low maintenance cost with a Shepard Niles Hoist.

Shepard Niles
CRANE & HOIST CORPORATION

Improve your competitive position in the industrial world. A request will bring you full data and tell you how you can put a Shepard Niles Crane to efficient use in your factory.

50 Men from Missouri

THESE 50 people devote their full time to engineering projects aimed at making Weatherhead products *better—for less*. They have "to be shown" by scientific tests just how good a product really is. And then, they often reverse the situation and show *us* how we can *improve* the products you use.

Our testing laboratories are equipped to reproduce every condition under which Weatherhead products may be used. For example—

(1) A tensile strength testing device gives brake hose a 1000 pound pull. (2) Tube fittings are subjected to 1800 vibrations a minute. (3) Hot salt is sprayed on valves and fittings to test the finish.

And there are scores of other scientific tests which help our "50 men from Missouri" determine what can be done to give you *better* Weatherhead products at *lower* cost.

It's this kind of extensive testing, plus modern methods of product development, design, and manufacturing, which is making "Look Ahead With Weatherhead" more than a slogan!



Look Ahead with

Weatherhead

THE WEATHERHEAD COMPANY, CLEVELAND 8, OHIO



NEW YORK • DETROIT • CHICAGO • ST. LOUIS • LOS ANGELES

ATTENTION DESIGN ENGINEERS

You can benefit most by calling Weatherhead while your product is in early design stages. A thorough study of your products can often result in improved performance, simplified serviceability, and savings in assembly time and labor.

CURTIS AIR HOISTS

*Save Time and
Labor at*
WARNER & SWASEY CO.

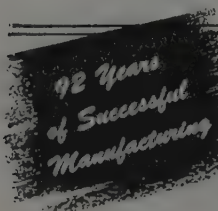


✓ Curtis Air Hoist used in operating the Cleveland Tram-rail System in the heat-treating department of Warner & Swasey Co., Cleveland.

It's another example of a well-known company relying on Curtis air-operated equipment to speed production, save time and labor, too. Curtis Air Hoists offer the following advantages to any company concerned with any lifting, pushing or pulling operation:

- Low first cost — lowest operating expense.
- Smooth, fast, accurate control of load.
- One-man or one-woman operated.
- Finger-tip control.
- Light weight — pendant, bracketed or rope-compounded types.
- Cannot be overloaded.
- Capacities up to 10 tons.

Find out how Curtis Air Hoists, Air Cylinders and Air Compressors can save man hours, cut costs in your plant. Write for Bulletin C-7.



CURTIS PNEUMATIC MACHINERY DIVISION of Curtis Manufacturing Company

1946 Kienlen Avenue, St. Louis 20, Missouri

Please send me Form C-7 on Curtis Air Hoists and Air Cylinders; also Curtis Air Compressors.

Name.....

Firm.....

Street.....

City.....Zone.....State.....

M-490

—INDUSTRIAL EQUIPMENT

vise base, but makes use of the table surface, thus allowing full vertical capacity for work from table surface to cutting tool. Construction is of heavy semi-steel castings, heavy ribbing, steel jaws. Heavy 1-in. 6-thread lead screw and bronze nut run in true alignment is assured by key way base of vise riding in T slot of machine flat table. Jaws are operated manually by screw adjustment.

Steel 9/2/46; Item No. 9360

Lift Truck

An addition to lift trucks made by Towmotor Corp., Cleveland, is the model LT-35 which includes a mounted motor engineered to cut wheel base length to 35 in.

New model weighs only 2800 lb and will lift, carry and stack a 1500



2000 lb load in tight aisles, elevators and crowded confines of highway trucks and freight cars. Truck design places operator at side of unit, making it easy for him to get on and off. Seat is protected front and rear.

Steel 9/2/46; Item No. 9327

Solenoid Valve

With development of a solenoid valve for high differential pressures Johnson Corp., Three Rivers, Mich., has the advantages of an automatic electric valve available for a wide range of applications. It combines immediate full flow ability to operate under pressures as high as 150 lb for liquid level control, hot and cold water, steam, oil and processing liquids up to 3650° F.

Valve is direct-acting and lever arrangement provides ample power to insure positive opening. Single seat construction eliminates trouble encountered when silt or other foreign matter fouls the piston.

Type HH series, with sizes from 1½-in., is suitable for differential

INDUSTRIAL EQUIPMENT—

res ranging from 125 to 150 lb; Type L, sizes 1 to 3 in., is for medium and low differential pressures. Models are furnished for operation 110, 220, or 0 v 60 cycle current.

el 9/2/46; Item No. 9573

Air Cleaner

When installed in duct systems of industrial air-circulating and conditioning installations, the electronic dust Precipitator developed recently by Raytheon Co., Waltham, Mass., removes 90 per cent of all airborne dirt. Manufactured by the company's Industrial Elec-



ics Division, the equipment also is capable of removing smoke, pollen, oil and other contaminating particles. The equipment consists of three principal parts—dust collector cell, ionizer unit and power supply. Electrostatic action in the equipment takes all airborne contaminating particles through an electrostatic field where they become charged, are precipitated onto collector plates which are alternately charged with a voltage.

el 9/2/46; Item No. 9506

Portable Mullor

Leardsley & Piper Co., 2124 North Broadway Avenue, Chicago 39, announces a portable model No. 7 Mulbaro for mulling molding and core sand. It is composed of two separate units: 3-wheeled barrow and mulling mechanism. The barrow carries and holds sand while it is being mulled. It has a spring controlled, tilted bowl to facilitate ease of loading and dumping. When the barrow is to be filled with sand, bowl is tipped back at 45 degree angle for an easy shovel-angle. As weight of sand increases, it gradually forces bowl down to a level position.

Mulling mechanism, operated by an

ember 2, 1946



TRIPLEX

for Toughness

**Cap Screws in
all four heads**

TRIPLEX Cap Screws and Set Screws are tough and rugged. They will really stand up under the hard, day by day pounding that today's equipment must take. Cap Screws made in Flat, Hex, Fillister and Button Heads. Furnished in all standard sizes up to 1" in diameter and 8" in length. For service choose TRIPLEX Cap Screws and Set Screws. Write for free wall chart for easy ordering.

THE TRIPLEX SCREW COMPANY

5341 Grant Avenue

Cleveland 3, Ohio

TRIPLEX THREADED
FASTENERS
CAP AND SET SCREWS • BOLTS, NUTS AND RIVETS



SIMPLICITY OF DESIGN AND RUGGED CONSTRUCTION *that produce Long Life*

★ Horsburgh & Scott Helical Speed Reducers are engineered for simplicity of design with every part ruggedly built from the finest materials. These features plus precision manufacture and assembly are your guarantee of better speed reducers that last longer . . . it will pay you to investigate these single, double and triple Helical Speed Reducers.

Send note on Company Letterhead for Speed Reducer Catalog 39

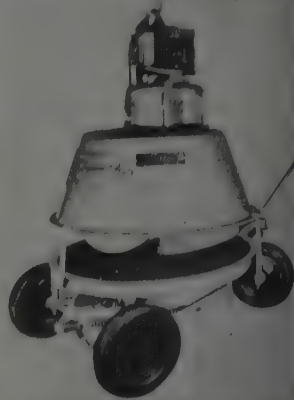
THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE • CLEVELAND, OHIO, U. S. A.

—INDUSTRIAL EQUIPMENT

electric motor, is suspended by a cable and is lowered and attached to the barrow for mulling operation. Mechanism includes two rubber-covered wheels that fit down into sand in barrow. The wheels are designed to the contour of the barrow bowl. Squeezing and kneading

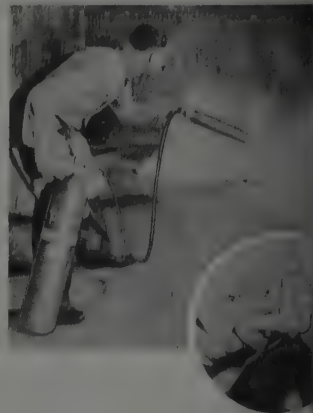


provides proper distribution of all materials and produces a thoroughly mixed sand.

Steel 9/2/46; Item No. 9534

Fire Extinguisher

Randolph Laboratories Inc., 8 Kinzie street, Chicago 11, is producing a new trigger-touch 15-lb CO₂ extinguisher that is operated with one hand. Covering a approaching fire, operator grasps

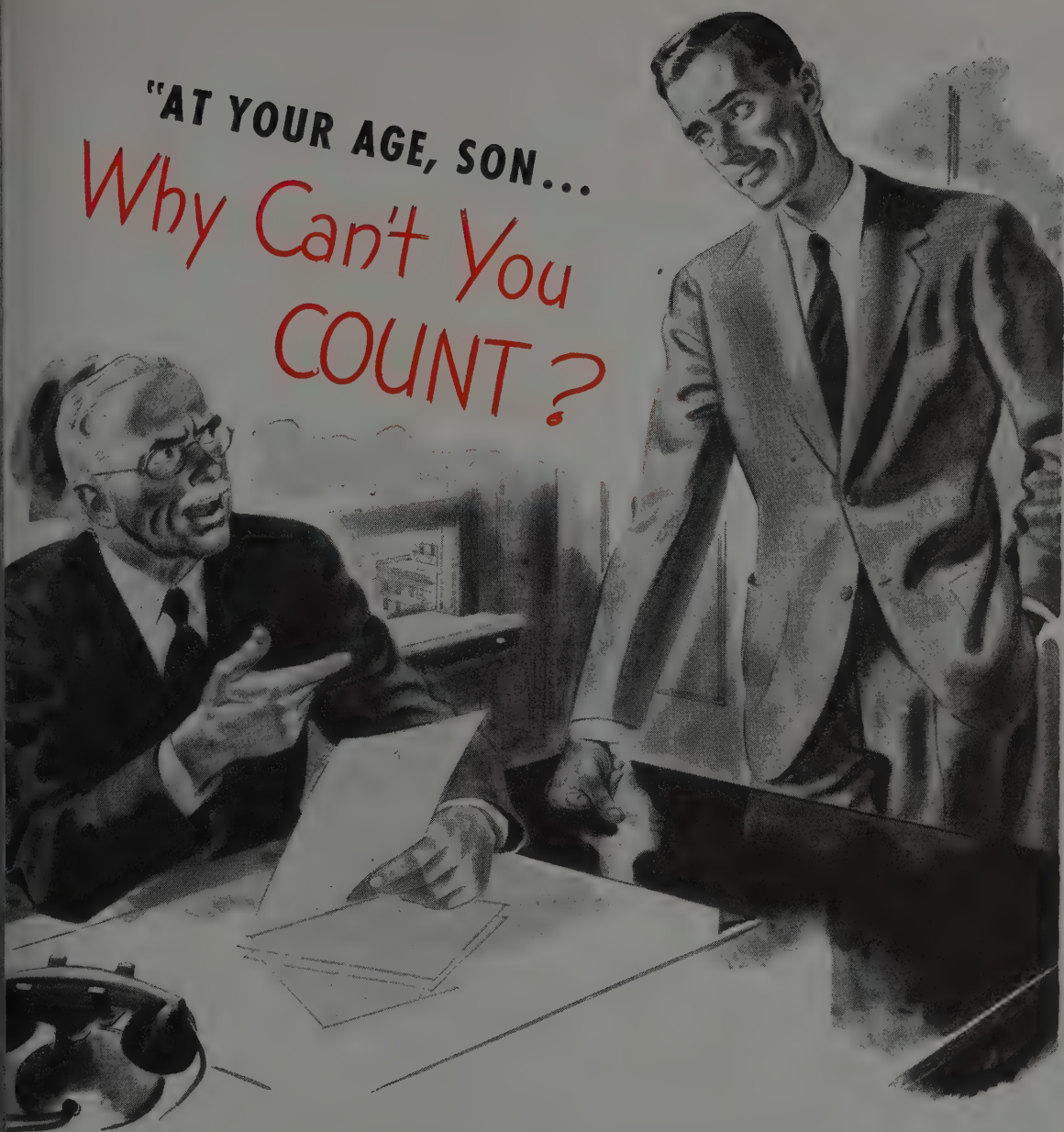


handle, aims it at the base of flame and gives a thumb-trigger discharge. The discharge is a penetrating, snowy blanket of carbon dioxide gas. Release of the trigger automatically stops flow, saving remaining gas for re-charge.

Long-range hose and nozzle keep the operator at a safe distance from the fire. The extinguisher permits easy access to overhead side-wall or compartment fires.

Steel 9/2/46; Item No. 9501

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Here's a question that may be fairly put by many manufacturers to products that have been out in the field, pulling their freight, for some time.

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VEEDER-ROOT INC.

Hartford 2, Connecticut

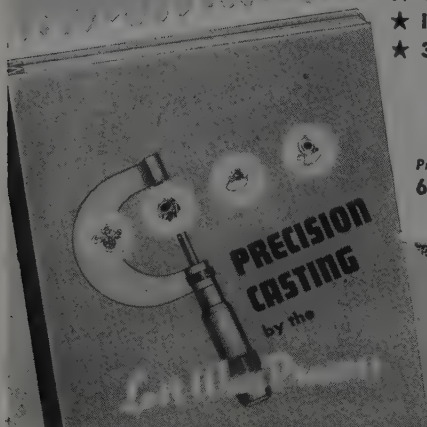
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is extended to you to visit our showroom and new completely equipped experimental laboratory to be opened in the near future. Inquiries Invited—No Obligation!

Tube Bending

(Continued from Page 95)

usually employs welded steel, which often has hard spots in it is full of internal strains. It is difficult to work this tubing into the desired shapes without distortion. Better bends are made of stress relieved or seamless tubing but the quality of welded tubing is generally good enough for the purpose. In handling strips and shapes, the problem is more acute. The price difference between the cheapest cold rolled and that which is stress relieved is no more than 75 cents per 100 lb., the loss in production from reworking the cheaper grade in order to make it meet the tolerances, is often 5 or 6 times the saving effected. Nothing is gained and often much is lost by trying to fabricate cheap stock, but the business usually will not admit it. He saves 50 cents in material and spends \$5 in increased fabrication costs, rather than realize the overall saving by using quality materials.

Applying Bending Moment

A bending machine is merely a means of applying a bending moment. A bending moment is what bends the tube. A bending moment is a force acting at a given distance from the axis of the tube. This varies with the kind of tube, the way in which it is made, its heat treatment, and so forth. For ordinary pipe, 21,700 in.-lb is required to bend a 3 in. extra heavy pipe. In a compression machine, both the force and the distance are adjustable. This is not true of a cold work machine, but the mandrel corrects irregularity which may exist. All materials have their own peculiarities and bending moments. For steel tube, the distance should be large and the distance small for steel pipe, the reverse is true. Too much is known about the theory of cold work. The calculation of stress is, however, simple. The old formula

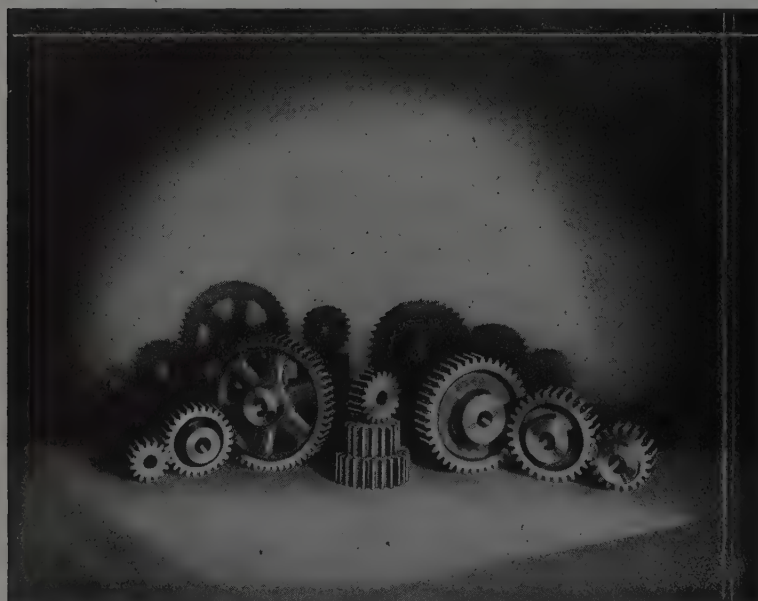
$$\text{mechanics is used: } F = \frac{M Y}{I}$$

When F is the tensile of the material at yield, M is the bending moment, I is the moment of inertia, and Y is the distance from the axis to the outside of the tube.

$$\frac{I}{Y} = \text{the section modulus (S),}$$

$$\text{therefore } F = \frac{M}{S}$$

Therefore $M = F \times S$ which is the moment required to bend the steel. This must be supplied by the bending machine. For a compression machine, the formula is $Torque (\sin A)^2$ where A is the angle between the point of bend and the point of application of the force. This usually boils down to $M = 0.1 \times T$. From



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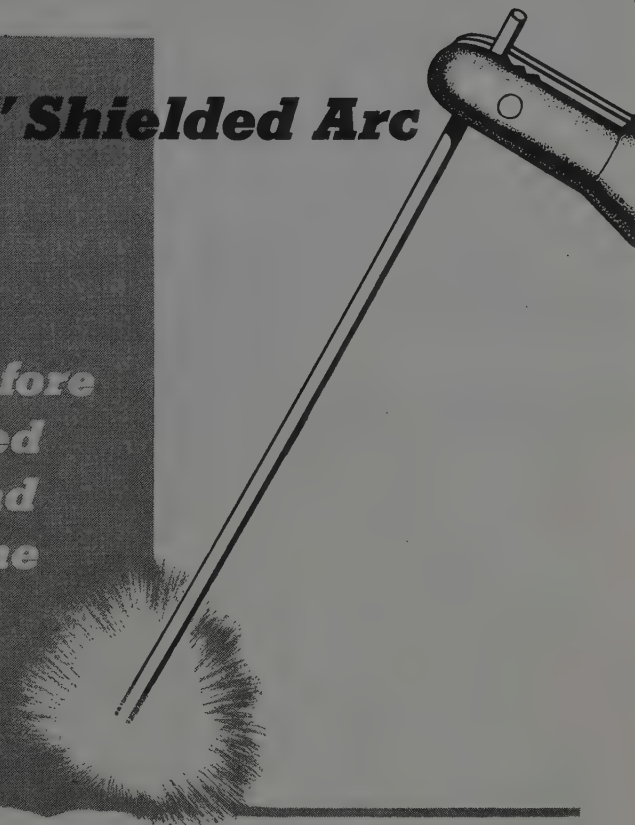
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which have heretofore
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to avoid underbead
cracking during the
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AMERICAN CHAIN & CABLE**



"PENOLA PRESCRIPTIONS"



THE PROBLEM... A plant was hampered by the occasional stoppage of a roller-bearing conveyor. This conveyor passes through a temperature zone just below 600° F. A light oil was used for lubrication and the extreme heat caused the conveyor bearings to become carbonized.

THE DIAGNOSIS... A Penola Industrial Engineer was called in to remedy this. He noted the formation of carbon on the bearings which indicated the need for a lubricant that would leave no carbon or gummy residue when vaporized, and lubricate the bearings in the hot zone.

THE PRESCRIPTION...

Rx Van Caloria 50

applied by an automatic lubricator just before the conveyor first comes in contact with the heat. The Van Caloria is a special high temperature lubricant containing a small amount of colloidal graphite. The oil left no residue and the graphite was present to protect the bearings until more Van Caloria was applied... and for over a year since the application, there have been no shutdowns—another Penola solution representing a saving of time, money and materials!

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can be calculated the size of the machine.

In the draw machine, the formula is simpler. Here $M = 0.6 \times T$, where the factor (0.6) is a constant used to overcome friction. This varies as the lubrication of the mandrel is improved as the shoe is lubricated.

Gage Design

(Concluded from Page 115)

screw. Tests have indicated that gages will adjust round within 0.0002-in. over the full range of adjustment, which, for example, is 0.005-in. for a 1-in. gage. In addition to adjusting round and along the helix of the thread, the gage weighs only half as much as conventional types as well as having a softer and warmer "feel" by virtue of the aluminum gage body. Premium grades of tool steel may be used in the insert portion, yielding additional life and savings in cost against making the entire gage out of such material. Overall dimensions of the combination ring gages are the same as American gage design standard, same for size.

Bullet Making at Chrysler Described in Book

Story of war-time operation of Chrysler's Evansville, Ind., plant in the production of small arms and special ammunition for the Army is now told in bound, illustrated, 77 page booklet published by Chrysler Corp., Detroit. Entitled "Bullets By the Billion," book embodies facts and figures including some material not previously made public, on planning production procedures, inspection and packaging of ammunition.

The Evansville plant is said to have turned out more than three billion .30 caliber cartridges, almost half a billion .50 caliber cartridges, hundreds of thousands of rounds of special types of ammunition; specially packed a billion and a half rounds of ammunition for use in the Pacific.

Silicone Resin Used In Heat Resistant Paints

New thermosetting silicone resin designed for use in formulating heat and moisture-resistant paints having a hard, mar-resistant surface was developed by Dow Corning Corp., Midland, Mich.

Known as DC 804, resin 60 per cent by weight, with toluene as the solvent is said to be recommended especially for use in white finishes having proper balance between those of ceramic coatings and ordinary organic paints. Because of resistance of this silicone resin to oxidation, ozone and ultra-violet radiation, finishes do not become yellow with age.

Bucket Elevator

(Concluded from Page 110)

minute or by conveyor extending directly over the bucket line at foot; it can be discharged at top to either side, through a rubber lined chute or directly by conveyor extending under the bucket. Low loading height eliminates need for mounting elevator in a pit or installing inclined feeder or other complicated structure.

Other handling capacity can be increased by using double head shaft design for increasing elevator speed. Additional length of bucket line is provided by takeups installed at top of double head shaft elevators. Bucket line length at foot.

Fig. 2 is perspective wash drawing of bucket elevator with single head shaft showing installation for lifting metallic pieces from an oil quenching tank, after heat treatment, see Fig. 3. Elevator buckets are perforated to permit draining oil back into tank. Considerable floor space is saved by this vertical installation.

When chain rollers engage sprocket at the top of ascent, loaded buckets are inverted, discharging their contents inwardly. Because of the slow speed, centrifugal action is practically absent; load falls to a mesh chute installation.

Flash-Butt Welding Booklet Offered

Prepared by the Automotive Welding Committee of the American Welding Society, a booklet containing fundamental data on flash-butt welding as applied to the automotive industry, has recently been made available. Included are sections on automotive-type steels, welding equipment, design considerations, tooling, techniques and inspection. Sketches show both good and poor joint designs of typical automotive flash-welding assemblies.

A 22-page booklet may be obtained from the society, 33 West 39th street, New York 18, for 30 cents per copy.

Information Contains Engineering Information

Photographs of applications of the company's products to war-time metal problems from delicate aluminum machinery as heavy stamping equipment, are included in a special issue, "The Eutectic Welder," published by Eutectic Welding Alloys Corp., New York. Publication discusses war and peace applications of the company's alloys along with their advantages.

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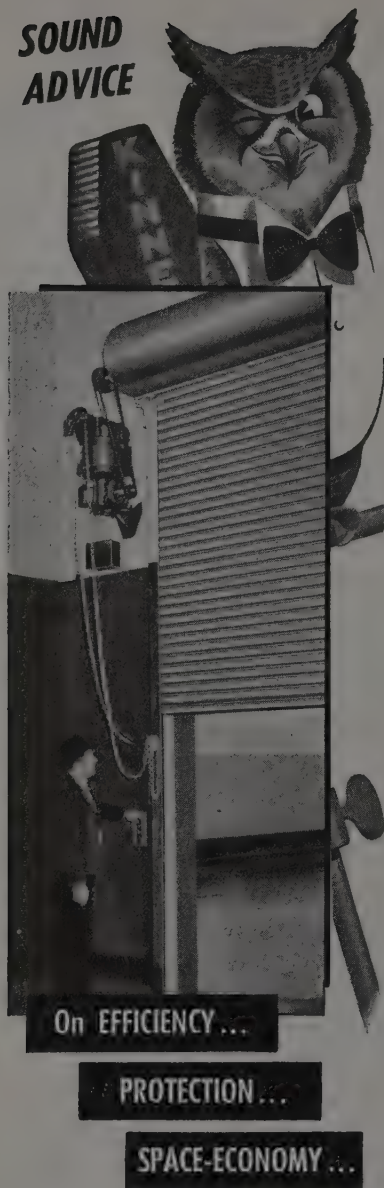
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Controlling Distortion

(Concluded from Page 101)

deviations in the hull plating, but this only made it evident that a more exacting method would have to be devised.

It was found that if elevations were taken daily on the pontoon deck while the welding sequence was being executed a more exacting check could be made so far as hogging or sagging was concerned.

Fig. 3 (A) shows a general plan of a dry dock pontoon deck. By dividing the deck shown here into eighteen spaces longitudinally, i. e., starting at frame No. 1 and spotting every third frame, then spotting shots at the dock centerline and at each wing-wall base transversely, an accurate tally could be maintained to show progressional deviations. In lieu of actual elevation figures the deviations were shown as being plus or minus from the transverse centerline elevation. The elevation at the transverse centerline, frame 28, was considered at 0.00.

Fig. 3 (B) is a chart showing the deviations in the pontoon deck so that the differences can be compared more easily, longitudinally and transversely, by stations.

Elevations Taken At Same Time

Since metals expand and contract with atmospheric temperature changes, it was evident that elevations taken at different hours of the day would differ greatly even though welding operations had ceased during that period. By experimentation, it was found that by taking elevations at the same time of day, each day, the most uniform tally was produced, and corrective measures were more easily controlled. At most construction activities the elevations were finally taken between the hours of 7 and 8 a.m. This was the procedure which the Bureau of Yards and Docks adopted and applied to the construction of 77 floating steel dry-docks fabricated between 1943 and 1946.

Having determined the progressional deviations each day by the time operations started, it was easy to position the welders so that a minimum of distortion would result from the day's operations. When the structure at the pontoon deck elevation showed a tendency to toe-up, the welders were positioned so the welding in that area would be retarded while the welding along the keel or bilge area would be accelerated. Varying the welding speeds and sequence by spot check control was the answer to another difficult problem.

Under the acid-test of combat warfare these dry docks proved to be stable and serviceable beyond all expectations. Not only were they more seaworthy, because of a minimization of residual

stresses, but when ten sections joined to create a 100,000-ton dry dock their fairness in line and insured speedy assembly and construction of structure. In the case of the additional docks, compliance with tolerances allowed by means of survey guaranteed full bearing of the sections on the end sections, and docks the setting of and the operation of deck gear, such as bilge blocks, bilge and keel blocks, etc., which of major importance in the repair of battle-damaged craft. At one time a three sectional dock was completed with only $\frac{3}{8}$ -in. deviation over a length of 528 ft.

These results were realized because they were carefully engineered and through the efforts of construction supervisors who knew the value of analyzing small details for correct measures and the mechanics of application.

Profiling Machine

(Concluded from Page 126)

which many different designs present under side of slide is mounted hydraulic cylinder, which is controlled by stylus for duplicating work parallel to machine spindle, see Fig. 3. Another master cylinder is attached to cross slide in side machine ways for duplicating work which runs at right angles to spindle, see Fig. 4.

Hydraulic pump unit, which includes oil tank, motor, pump, relief valve, pressure gage, is separate and located convenient to machine. Installation is shown in Fig. 1. Hose connects pump with master cylinder and control valve stylus.

No complicated mechanisms, no controls interfere with operator while machine is in operation. Operator has complete control of machine at all times and can easily watch cutting tool at work.

Profiling arrangement may be engaged and regular cutting tool may be applied to operate lathe on regular work stop collar on feed rod will control feed at any predetermined position.

Electronic Maintenance Booklet Offered

Six basic maintenance operations—cleaning, inspecting, feeling, tightening and lubricating—are included in the handbook B-3658 on maintenance of electronic equipment recently published by Westinghouse Electric Corp., 668, Pittsburgh 30. These operations apply to vacuum and ignitron tubes, capacitors, resistors, fuses, transformer terminal blocks, meters and other components of electronic equipment may be obtained by writing the

ning Machine

(Continued from Page 118)

basket E, made from $\frac{3}{4}$ -in. mesh. Two round pins F, fastened to basket are made so as to have a good fit in slots machined in drum C, as shown in Fig. 4.

Drum C is revolved by means of level gears the basket also revolves. The drum and basket are held in contact by means of pins F. On the basket are projections H and fastened to shell are two cams G. Figs. 1 show location of G and H.

Drum and basket are revolving the pins H come in contact with cams G, by virtue of their design, cause the basket to be raised out of drum a distance equal to the rise of the cams. When the pins have passed the cams, basket falls again until its flange comes in contact with the upper edge of the drum. On the rise and fall of basket, pin F passes through a slot in drum C, as shown in Fig.

The kerosene or other cleaning fluid is pumped into the drum. Parts to be cleaned are placed in the wire basket, and the cover closed. The machine then starts and with the double motion the basket is whirled against the parts and the dirt is so are plunged in and out of the fluid.

The double action of the machine was designed to clean articles quickly and efficiently without attention from the operator other than loading and unloading. A further advantage is that raising and lowering of the basket deposits dirt from parts into the bottom of the tank or drum C from which dirt is removed by opening plug drain, as shown in Fig. 2.

Alloys Used in

Jet Turbine Blades

The design and description of forging, heat treating and tempering of two steel alloys developed by the Germans in the production of heat resistant gas turbine blades for jet planes is subject of 12-page report that may now be obtained from the Office of the Publication Board, Department of Commerce, Washington,

obtained from microfilm records of the Krupp plant at Essen, Germany, reveals that the alloys were made in induction furnaces, cast in molds of 8 cm square, and forged by rapid blows with a 6000-lb hammer. All sheet metal in high temperature service in jet planes was low carbon steel with about 0.5 per cent titanium, added for oxidation resistance at 1000° F.

speed reducers

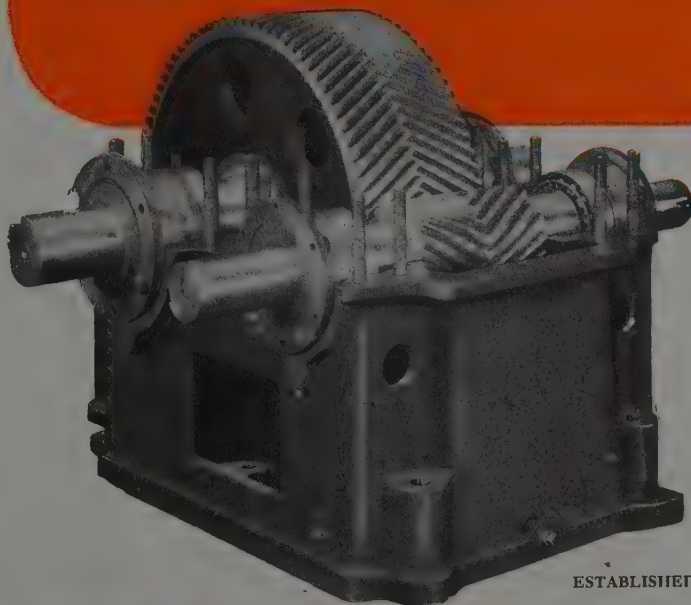


Speed reduction is more than a guess-work drag. It is transmission of power controlled to a hair. OTTUMWA GEAR REDUCTION UNITS are furnished in single, double and triple reductions, with respective H. P. capacities 2-1 to 10-1; 10-1 to 40-1; 30-1 to 200-1.

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OTTUMWA cuts Sykes continuous tooth herringbone gears up to 10'2" dia. 24" face, complete in steel or semi-steel or from blanks furnished by the customer. Much valuable technical data will be found in our catalog. This booklet will be mailed on request.



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The Business Trend

Steady Pace Held by Industrial Production

STEADINESS characterized the rate of industrial activity in the week ended Aug. 24 and as a result STEEL's industrial production index for that period registered 152 per cent (preliminary), the level that prevailed also in the previous week. That rate is the highest recorded since the end of war a year ago.

Although railroad carloadings have been declining since the third week of July, the rate of steel ingot production has remained high in recent weeks, while electric power output and automobile assemblies have been climbing.

AUTOS—In its upward trend, auto production in the week ended Aug. 17 hit 91,620 units, highest since the second week of December, 1941.

RAILROADS—Although railroad carloadings have declined since the third week of July, the volume of freight traffic handled by Class I railroads in July totaled 52 billion ton-miles, compared with 50 billion in June. Compared with July, 1945, freight traffic handled in July, 1946, was off 8,720,580,000 ton-miles. For the first seven months of 1946 the ton-miles of revenue freight totaled 324,600,000,000, compared with 425,456,502,000 in the corresponding period of last year.

STEEL—Production of steel ingots has remained near 90 per cent of capacity for the past month and although the demand for steel is heavy it is unlikely that the rate

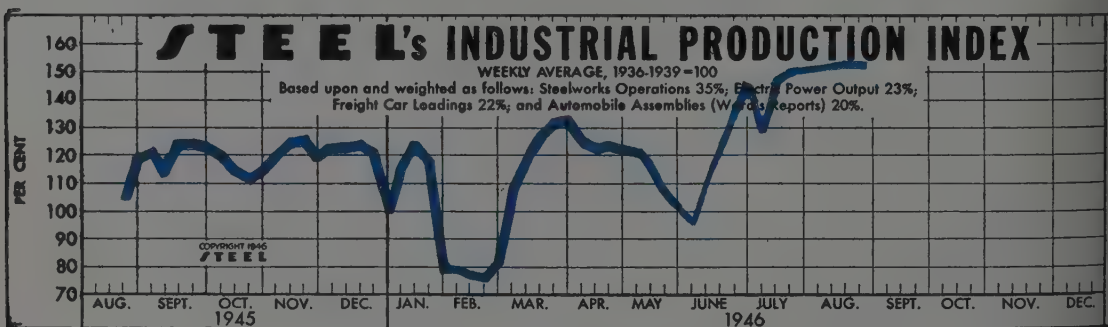
will go much above the 90 mark because of a shortage of scrap and pig iron and because of the necessity of making furnace repairs that were delayed during the period.

COAL—Output of bituminous coal is gradually overcoming the deficit incurred early this year during the miners' strike. Although production in the week ended Aug. 17 was only 11,980,000 tons whereas it was 12,300,000 in the previous week the total output this year through Aug. 17 had risen to within 14.6 per cent of the total for the corresponding period of 1945.

PRICES—The upward trend of prices continues, a result that the U. S. Bureau of Labor Statistics indicates in wholesale prices in the week ended Aug. 17 rose to 100 per cent, up 1.2 points over the previous week.

EARNINGS—Hourly earnings in 25 manufacturing industries surveyed by the National Industrial Conference Board reached new peak levels in June. The average June hourly rate was \$1.189, up 0.8 per cent over the previous week. Weekly earnings in June averaged \$46.78, an increase of 1.3 per cent over the previous month. Also up in employment, the June index being 3.1 per cent above the previous month and almost up to the level prevailing when war ended in August, 1945.

INVENTORIES—Value of inventories held by manufacturing firms at the end of July was more than \$600 million, higher than June inventories, the rise being the sixth monthly one on record. Preliminary figures from representative manufacturing firms showed inventories on July 1 were valued at nearly \$18 billion, a record high.



The Index (see chart above):

Latest Week (preliminary) 152

Previous Week 152

Month Ago 145

FIGURES THIS WEEK

INDUSTRY

	Latest Period*	Prior Week	Month Ago
Steel Ingot Output (per cent of capacity)†	89	90	86.5
Electric Power Distributed (million kilowatt hours)	4,444	4,422	4,352
Bituminous Coal Production (daily av.—1000 tons)	1,997	2,050	2,058
Petroleum Production (daily av.—1000 bbls.)	4,836	4,843	4,926
Construction Volume (ENR—Unit \$1,000,000)	\$97.0	\$129.1	\$140.9
Automobile and Truck Output (Ward's—number units)	91,620	88,990	84,720

*Dates on request. †1946 weekly capacity is 1,762,381 net tons. 1945 weekly capacity was 1,831,636 net tons.

TRADE

Freight Carloadings (unit—1000 cars)	\$80†	\$88	\$91
Business Failures (Dun & Brodstreet, number)	17	17	13
Money in Circulation (in millions of dollars)†	\$28,365	\$28,353	\$28,187
Department Store Sales (change from like week a year ago)†	+90%	+29%	+28%

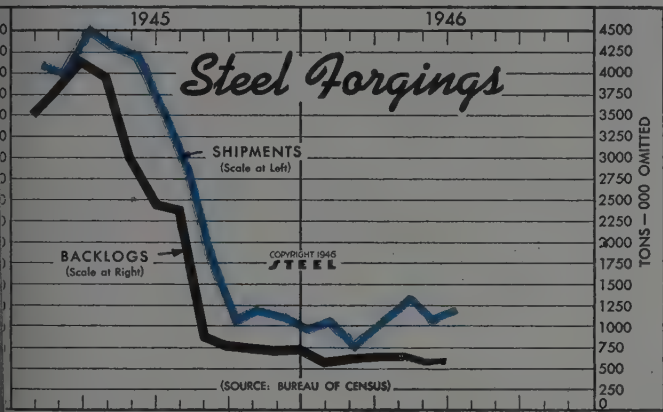
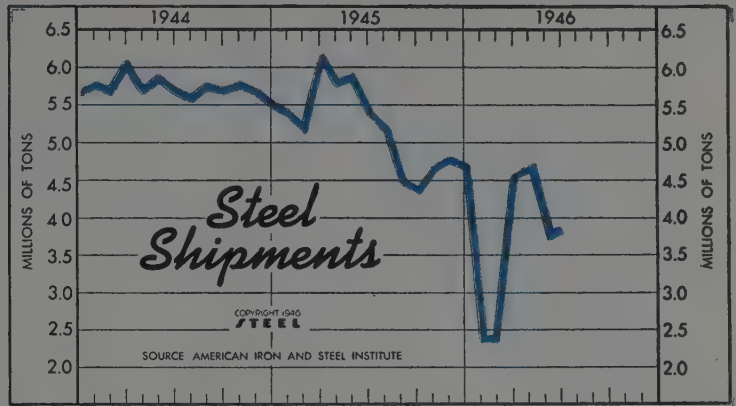
†Preliminary. †Federal Reserve Board.

Steel Shipments

(Net Tons)

1946	1945	1944
2,391,850*	5,435,647	5,767,687
2,391,849*	5,184,498	5,700,673
4,644,988	6,179,452	6,146,595
4,698,081	5,769,786	5,744,177
3,906,064	5,938,055	5,859,786
3,966,628	5,437,206	5,703,314
	5,214,074	5,597,631
	4,512,637	5,837,328
	4,391,143	5,743,487
	4,660,237	5,752,147
	4,779,628	5,686,527
	4,729,561	5,458,133

ures for January and February, 1946,
rely averages derived from a report that
ed shipments for those two strike-affected
into a total of 4,788,699 tons.



Steel Forgings

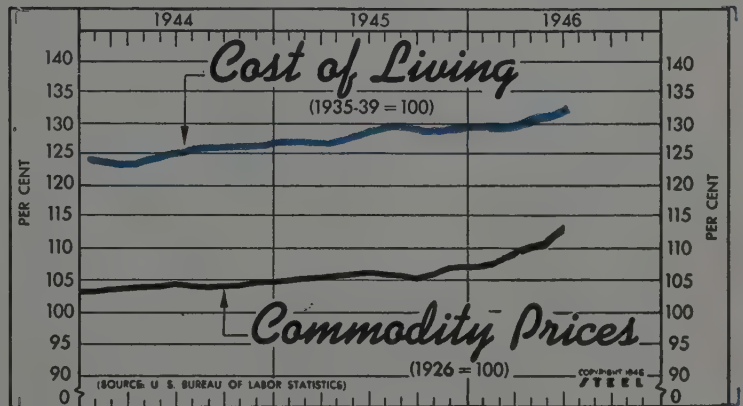
Tons—000 omitted

	Shipments	Unfilled orders*	Consumption of steel
	1946	1945	1946
Jan. . . .	180	498	561
Feb. . . .	93	483	596
Mar. . . .	123	549	612
Apr. . . .	155	524	604
May	139	510	599
June	147	430	610
July . . . .	...	345	...
Aug.	227	...	841
Sept.	126	...	745
Oct.	145	...	735
Nov.	135	...	708
Dec.	119	...	724

* Forgings for sale.

Wholesale Commodity Price—
Cost of Living Indexes

Commodities— (1926=100)	Living Cost— (1935-39=100)
1946	1945
107.1	104.9
107.7	105.2
108.9	105.3
110.2	105.7
111.0	106.0
112.9	106.1
...	105.9
...	105.7
...	105.2
...	105.9
...	106.8
...	107.1
...	105.8



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Clearings (Dun & Bradstreet—millions)	\$12,163	\$11,100	\$12,342	\$9,023
Net Gross Debt (billions)	\$267.7	\$267.7	\$268.3	\$263.2
Volume, NYSE (millions)	\$17.0	\$17.4	\$19.4	\$42.9
Sales, NYSE (thousands)	4,506	3,747	5,426	5,756
and Investments (billions)†	\$59.9	\$59.8	\$60.9	\$67.1
and States Gov't. Obligations Held (millions)†	\$41,460	\$41,454	\$42,643	\$46,770

Member banks, Federal Reserve System.

S

U.S. composite finished steel price average	\$64.45	\$64.45	\$64.45	\$58.27
Commodities†	128.3	127.1	124.2	105.5
Crude Oil Raw Materials†	146.3	145.7	141.4	116.9
Manufactured Products†	122.9	121.3	118.9	102.1

Bureau of Labor Statistics Index, 1926 = 100.

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and Fireblok Insulation Line**

PROPERTIES	INSULATING BRICK			INSULATING FIREBRICK AND FIREBLOK			
	SII-O-Cel Natural	SII-O-Cel C-22	SII-O-Cel Super	JM-1620	JM-20	JM-23	JM-26
Density—lb. per cu. ft.	30	38	40	29	35	42	48
Transverse Strength—lb. per sq. in.	140	115	90	60	80	120	125
Cold Crushing Strength— lb. per sq. in.	400	700	300	70	115	170	190
Linear Shrinkage—Percent	1.4 @ 1600F	0.8 @ 2000F	2.0 @ 2500F	0.0 @ 2000F	0.0 @ 2000F	0.3 @ 2300F	1.0 @ 2600F
Reversible Thermal Expansion— Percent	0.1 @ 1600F	0.7 @ 2000F	1.3 @ 2000F	0.5—0.6 @ 2000F	0.5—0.6 @ 2000F	0.5—0.6 @ 2000F	0.5—0.6 @ 2000F
Conductivity at Mean Temperature							
500F	1.01 .67	1.67	1.70	.77	.97	1.51	1.92
1000F	1.13 .79	1.88	1.95	1.02	1.22	1.91	2.22
1500F	1.24 .90	2.08	2.19	1.27	1.47	2.31	2.52
2000F	— —	—	2.45	—	1.72	2.70	2.82
Recommended Service Back Up Exposed	1600F —	2000F —	2500F —	2000F 1600F	2000F 2000F	2300F 2300F	2600F 2600F
Recommended Mortar for Setting Brick	SII-O-Cel Mortar	SII-O-Cel Mortar	SII-O-Cel Super Brick Mortar	J-M No. 1626 Cement	J-M No. 1626 Cement	J-M No. 1626 Cement	J-M No. 1626 Cement

Note: 1. Above tests are in accordance with ASTM tentative standards.

2. Conductivity is expressed in Btu in. per hr per sq ft per deg F at the designated mean temperatures.

3. II —with heat flow parallel to brick strata.

I —with heat flow perpendicular to brick strata.

**In Insulating Firebrick, it's the correct BALANCE of
thermal and physical PROPERTIES THAT COUNTS!**

AS THE CHART SHOWS YOU—each of the seven types of J-M Insulating Brick and Insulating Firebrick is designed to do a special job . . . and do it well!

The three J-M Insulating Brick provide great structural strength, the four J-M Insulating Firebrick combine strength with ex-

ceptional resistance to spalling. All seven offer the advantages of light weight and low conductivity. They are recommended as back-up insulation or insulating firebrick for all industrial requirements.

For all the facts, write Johns-Manville, Box 290, N. Y. 16, N. Y.



Johns-Manville *First in* **Insulations**

Mills Expected To Open Books Soon for 1947

Carryover and preferences to take up much capacity . . . Scrap price increase expected soon . . . Production holds high level

FORMAL opening of books for first quarter of next year by some mills is expected during September, some as early as the middle of the month. Much will depend on how quickly mills can gauge the volume of priority and selective tonnage for fourth quarter. This tonnage is beginning to be received and probably within a fortnight the larger part will have been specified.

Some producers of certain steel items already have acted on tonnage for next year but such action has been irregular and the exception to the general rule. In certain cases of pipe and tubing some producers have committed themselves far into the future. Producers of track accessories are booked well into next year and some plate mills have been accepting limited tonnages for first quarter. Protective provisions have been granted in various cases on a required next year for identified projects and other similar cases can be cited. However, in general, books have not yet been opened.

In many cases there will be a substantial carryover of 1946 commitments into next year. The outlook in that respect is not as bad as recently, as various mills, especially those on quarterly quota basis have been reducing allotments to consumers. Preference tonnage has been substantial but much of this has been scheduled at expense of customers unable to produce certificates.

In general strenuous efforts have been made to bring commitments and supply more into balance and it is believed they will be reflected by a smaller carryover at the end of this quarter than at the end of the preceding period. A large sheet producer has decided to issue no quotas for fourth quarter, putting all production into certified tonnage and arrearages, in the hope of attaining a reasonable balance by the end of the year.

DISTRICT STEEL RATES

(Percentage of Ingot Capacity Engaged in Leading Districts)

	Week Ended Aug. 31	Change	Same Week	
			1945	1944
Pittsburgh	96.5	- 0.5	65	91
Chicago	92	- 0.5	81	98.5
Eastern Pa.	83	+ 2	72	95
Youngstown	89	+ 1	76	93
Wheeling	89	+ 4	91	92
Cleveland	90	None	83.5	92
Buffalo	90.5	+ 4.5	65	90.5
Birmingham	93	None	95	95
New England	86	None	78	85
Cincinnati	84	None	80	92
St. Louis	54.5	None	65	87
Detroit	91	+ 5	89	89
Estimated national rate	90	+ 1	75	96.5

Based on weekly steelmaking capacity of 1,762,381 net tons for 1946; 1,831,636 tons for 1945; 1,791,287 tons for 1944.

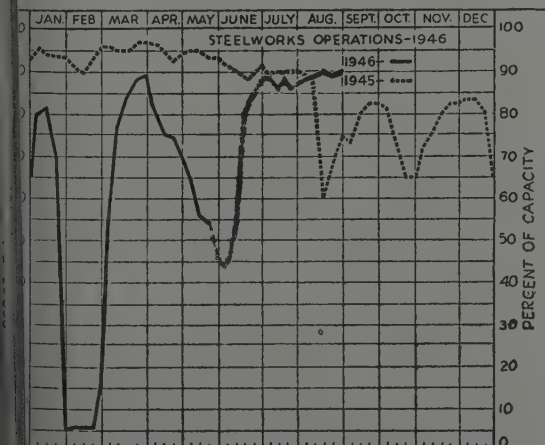
A heavy load of preference work is indicated for fourth quarter, particularly in shapes, bars and sheets, more particularly galvanized sheets. Much of this will fall under CC ratings, especially for housing and agricultural needs, with probable continuation of export allotments in the final quarter, such as were set up for September, with the October distribution expected shortly, and special directives for other programs, such as 40,000 tons of 16-gage cold-rolled sheets for caskets for service men buried abroad, which is up for early action.

While orders carrying CC ratings are only now beginning to appear in volume, sellers assert that a number are from buyers not regular customers and they are not disposed to accept them unless instructed to do so by CPA. Tonnage already promised for fourth quarter is being applied against such rated orders as may come from customers to whom the promises were made.

Announcement of higher ceilings on prepared scrap are expected to be made by OPA soon, in accordance with recommendations of the industry advisory committee. The latter has ruled against an increase on two previous occasions, with OPA following its advice. Release of hoarded scrap is expected to follow such an announcement. No definite price was recommended by the committee but it is believed the increase will be less than the \$3.50 which has been urged.

Steelmaking operations hold close to the level of the past few weeks, the estimated national rate for last week being 90 per cent of capacity, a rise of 1 point. Pittsburgh dropped ½-point to 96½ per cent and Chicago ½-point to 92. Wheeling advanced 4 points to 89 per cent, Youngstown 1 point to 89, Detroit 5 points to 91, Buffalo 4½ points to 90½ and eastern Pennsylvania 2 points to 83. Rates were unchanged as follows: Cincinnati 84, Birmingham 93, New England 86, St. Louis 54½, Cleveland 90 and West Coast 84.

Pig iron production in July reached 4,705,277 net tons, largest output since July, 1945, when 4,801,467 tons were made. The July tonnage showed a gain of 1,023,004 tons over June's production of 3,682,273 tons.



COMPOSITE MARKET AVERAGES

	Aug. 31	Aug. 24	Aug. 17	One Month Ago July, 1946	Three Months Ago May, 1946	One Year Ago Aug., 1945	Five Years Ago Aug., 1941
Finished Steel	\$64.45	\$64.45	\$64.45	\$64.45	\$63.54	\$58.27	\$56.7
Semifinished Steel	40.60	40.60	40.60	40.60	40.60	37.80	38.0
Steelmaking Pig Iron	27.50	27.50	27.50	27.50	25.50	24.00	23.0
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	19.1

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe.
 Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross to

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Material

	Aug. 31, 1946	July, 1946	May, 1946	Aug., 1945
Steel bars, Pittsburgh	2.50c	2.50c	2.50c	2.25c
Steel bars, Philadelphia	2.86	2.86	2.82	2.57
Steel bars, Chicago	2.50	2.50	2.50	2.25
Shapes, Pittsburgh	2.35	2.35	2.35	2.10
Shapes, Philadelphia	2.48	2.48	2.465	2.215
Shapes, Chicago	2.35	2.35	2.35	2.10
Plates, Pittsburgh	2.50	2.50*	2.50	2.25
Plates, Philadelphia	2.558	2.558	2.55	2.30
Plates, Chicago	2.50	2.50	2.50	2.25
Sheets, hot rolled, Pittsburgh	2.425	2.425	2.425	2.20
Sheets, cold-rolled, Pittsburgh	3.275	3.275	3.275	3.05
Sheets, hot-rolled, Gary	4.05	4.05	4.05	3.70
Sheets, cold-rolled, Gary	2.425	2.425	2.425	2.20
Sheets, No. 24 galv., Gary	3.275	3.275	3.275	3.05
Sheets, No. 24 galv., Gary	4.05	4.05	4.05	3.70
Hot-rolled strip, over 6 to 12-in., Pitts.	2.35	2.35	2.35	2.10
Hot-rolled strip, Pittsburgh	3.05	3.05	3.05	2.80
Bright basic, bess. wire, Pittsburgh ..	3.05	3.05	3.05	2.75
Wire nails, Pittsburgh	3.75	3.75	3.25	2.90
Tin plate, per base box, Pittsburgh ..	\$5.25	\$5.25	\$5.25	\$5.00

Semifinished Material

	Aug. 31, 1946	July, 1946	May, 1946	Aug., 1945
Sheet bars, Pittsburgh, Chicago	\$38.00	\$38.00	\$38.00	\$36.00
Slabs, Pittsburgh, Chicago	39.00	39.00	39.00	36.00
Rerolling billets, Pittsburgh	39.00	39.00	39.00	36.00
Wire rods, No. 5 to 3/4-inch, Pitts....	2.30c	2.30c	2.30c	2.15c

Pig Iron

	Aug. 31, 1946	June, 1946	Apr., 1946	July, 1945
Bessemer del. Pittsburgh	\$29.77	\$29.69	\$27.69	\$28.00
Basic, Valley	28.00	28.00	26.00	26.00
Basic, eastern del. Philadelphia	29.93	29.93	27.84	28.00
No. 2 fdry., del. Pgh. N. & S. sides ..	29.27	29.19	27.19	27.00
No. 2 foundry, Chicago	28.50	28.50	26.50	26.00
Southern No. 2, Birmingham	24.88	24.88	22.88	22.00
Southern No. 2 del. Cincinnati	28.94	28.94	26.94	26.00
No. 2 fdry., del. Philadelphia	30.43	30.43	28.34	28.00
Malleable, Valley	28.50	28.50	26.50	26.00
Malleable, Chicago	28.50	28.50	26.50	26.00
Charcoal, low phos., fob Lyles, Tenn.	33.00	33.00	33.00	33.00
Gray forge, del. Pittsburgh	28.69	28.69	26.69	26.00
Ferromanganese, fob cars, Pittsburgh	140.00	140.00	140.00	140.00

Scrap

	Aug. 31, 1946	June, 1946	Apr., 1946	July, 1945
Heavy melting steel, No. 1, Pittsburgh	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt, steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke

	Aug. 31, 1946	June, 1946	Apr., 1946	July, 1945
Connellsville, furnace ovens	\$8.75	\$8.75	\$7.50	\$7.50
Connellsville, foundry ovens	9.87½	9.50	8.25	8.25
Chicago, by-product fdry., del.	15.10	15.10	13.75	13.75

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 cent federal tax on freight. Pricing on rails was changed to net ton basis as of Feb. 15, 1946.

Semifinished Steel

Carbon Steel Inrots: Fob mill base, rerolling quality, standard analysis, \$33.

Alloy Steel Inrots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop, \$48.69.

Rerolling, Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, \$39; Detroit, del., \$41; Duluth (billets), \$41; Pac. ports (billets), \$51. (Andrews Steel Co., carbon slabs, \$41; Northwestern Steel & Wire Co., \$41, Sterling, Ill.; Granite City Steel Co., \$47.50 gross tons slabs from D.P.C. mill. Geneva Steel Co., \$58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, \$47; Detroit, del., \$49; Duluth, billets, \$49; forging billets fob Pac. ports, \$59.

(Andrews Steel Co. may quote carbon forging billets \$50 gross ton at established basing points; Follansbee Steel Corp., \$49.50 fob Toronto, O.; Geneva Steel Co., \$64.64, Pacific ports.)

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, \$58.43; del. Detroit \$60.43; eastern Mich. \$61.43.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, \$38. (Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, \$39, fob mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb, 2.05c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—3/4 in. inclusive, per 100 lb, \$2.30. Do., over 3/4—1 1/2 in., incl., \$2.45; Galveston, base, \$2.40 and \$2.55, respectively. Worcester add \$0.10; Pacific ports \$0.50.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham base, 20 tons one size, 2.50c; Duluth, base, 2.60c; Detroit, del., 2.60c; eastern Mich., 2.65c; New York, del., 2.86c; Phila., del., 2.86c; Gulf ports, dock, 2.85c; Pac., ports, dock, 3.15c. (Sheffield Steel Corp. may quote 2.75c, fob St. Louis; Joslyn Mfg. & Supply Co., 2.55c, fob Chicago.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.92c; Detroit, del., 3.02c. (Texas Steel Co. may use Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	\$0.108	4300	\$1.839
2300	1.838	4400	1.286
2500	2.759	4800	2.326
3000	0.541	5100	0.379
3100	0.920	5130 or 5152 ..	0.494
3200	1.461	6120 or 6152 ..	1.028
		6145 or 6150 ..	1.298
3400	3.462	8612	0.704
4000	0.487	8720	0.737
4100 (15-25 Mo) 0.737		9830	1.407
(20-30 Mo) 0.812			

* Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.10c; Detroit, 3.15c; Toledo, 3.25c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 3.625c; Detroit, del., 3.725c; eastern Mich., 3.755c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.35c;

Detroit, del., 2.45c; eastern Mich. and Toledo, 2.50c; Gulf ports, dock, 2.70c; Pacific port dock, 2.75c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.35c; Detroit, del., 2.45c; eastern Mich. and Toledo, del., 2.50c; Gulf ports, dock, 2.70c.

Iron Bars: Single refined, Pitts., 4.76c; do refined, 5.84c; Pittsburgh, staybolt, 6.22c; T Haute, single ref., 5.42c; double ref., 6.78c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, G. Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base, 2.425c; Gulf City, base, 2.525c; Detroit, del., 2.5 eastern Mich., del., 2.575c; Phila., del., 2.6 New York, del., 2.685c; Pacific ports, 2.5 (Andrews Steel Co. may quote hot-rolled sheet for shipment to the Detroit area from the Detroit, O., base; Alan Wood Steel Co., shohocken, Pa., may quote 3.00c on hot carbon sheets, Sparrows Point, Md.)

Cold-Rolled Sheets: Pittsburgh, Chicago, G. Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.275c; Granite City, base, 3.375c; Detroit, del., 3.375c; eastern Mich., del., 3. New York, del., 3.615c; Phila., del., 3. Pacific ports, 3.925c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 4.05c; Gulf City, base, 4.15c; New York, del., 4. Phila., del., 4.24c; Pacific ports, 4.60c.

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29-gage, per square, 3. Culvert Sheets: Pittsburgh, Chicago, G. Cleveland, Birmingham, 16-gage not corrugated, alloy, 4.15c; Granite City, 4.25c; 4.50c; 4.60c; copper iron, 4.50c; pure iron, 4.50c; coated, hot-dipped, heat-treated, No. 24, 4.60c, 4.60c.

Aluminized Sheets, 20 gage: Pittsburgh, dipped, coils or cut to lengths, 9.60c.

melting Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middleland, base 3.00c; Granite City, base 3.00c; 12-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middleland, base 3.00c; eastern Mich., 3.35c; Pacific ports, 3.85c; 20-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middleland, base 3.00c; Detroit, del., 3.90c; eastern Mich., 4.45c; Pacific ports, 4.45c.

Sheet Piles No. 24:

	Pittsburgh	Pacific	Granite
	Base	Ports	City
Standard grade	3.90c	4.55c	4.00c
Standard	4.25c	5.00c	4.35c
Standard	4.75c	5.50c	4.85c
Standard	5.425c	6.175c	5.525c
Standard	6.125c	6.875c	6.225c

Standard 6.625c 7.375c
Standard 7.625c 8.375c
Standard 8.125c 8.875c
Standard 8.925c 9.675c

Roller Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middleland, 6-in. and narrower: Base, 2.45c; Detroit, 2.55c; eastern Mich., del., 2.60c; Pacific ports, 3.10c. (Superior Steel Corp. may quote c. Pitts.)

6-in.: Base, 2.35c; Detroit, del., 2.45c; eastern Mich., del., 2.50c; Pacific ports, 3.00c. (Superior Steel Corp. may quote c. Pitts.)

Roller Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less, 3.05c; Chicago, base, 3.15c; Detroit, del., 3.15c; eastern Mich., del., 3.20c; Worcester, base, 3.25c. (Superior Steel Corp. may quote 4.70c, Pitts.)

Finished Spring Steel: Pittsburgh, Cleveland, 0.26-0.50 carbon, 3.03c. Add 0.20c Worcester.

Terne Plate

ceiling prices announced March 1, 1946.)
Plate: Pittsburgh, Chicago, Gary, 100-lb box, \$5.25; Granite City, Birmingham, 100-lb box, \$5.35.

Polystyrene Tin Plate: Pittsburgh, Gary, 100-lb box, 0.25 lb tin, \$4.60; 0.50 lb tin, \$4.75; 0.75 lb tin, \$4.90; Granite City, Birmingham, Sparrows Point, \$4.70, \$4.85, \$5.00, respectively.

Mil Black Plate: Pittsburgh, Chicago, base 29-gage and lighter, 3.30c; Granite City, Birmingham, Sparrows Point, 3.40c; Pacific ports, boxed, 4.30c.

Terne: Pittsburgh, Chicago, Gary, No. 10, 4.05c; Pacific ports, 4.80c.

Facturing Terne (Special Coated): Pittsburgh, Chicago, Gary, 100-base box, \$4.55; Granite City, Birmingham, Sparrows Point, \$4.70, \$4.85, \$5.00, respectively.

Terne: Pittsburgh, Chicago, Gary, 100-lb box, 0.25 lb tin, \$4.60; 0.50 lb tin, \$4.75; 0.75 lb tin, \$4.90; Granite City, Birmingham, Sparrows Point, \$4.70, \$4.85, \$5.00, respectively.

Terne: Pittsburgh, Chicago, Gary, 100-lb box, 0.25 lb tin, \$4.60; 0.50 lb tin, \$4.75; 0.75 lb tin, \$4.90; Granite City, Birmingham, Sparrows Point, \$4.70, \$4.85, \$5.00, respectively.

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(Fob Pittsburgh, Chicago, Cleveland, Birmingham, per base column)

Woven fence, 15½ gage and heavier..... 72
 Barbed wire, 80-rod spool..... 79
 Barbless wire, twisted..... 79
 Fence posts..... 74
 Bale ties, single loop..... 72½

*Add \$0.10 for Worcester, \$0.05 for Duluth and \$0.50 for Pacific ports.

†Add \$0.30 for Worcester, \$0.50 for Pacific ports. Nichols Wire & Steel may quote \$4.25; Pittsburgh Steel Co., \$4.10.

‡Add \$0.50 for Pacific ports.

§Add \$0.10 for Worcester; \$0.70 Pacific ports.

**Pittsburgh Steel Co. may quote 89.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about \$200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld					
Steel			Iron		
In.	Blk.	Galv.	In.	Blk.	Galv.
¾	53	80	1½	21	0¼
¾ & ¾	56	37½	¾	27	7
¾	60½	48	1-1¼	31	13
¾	63½	52	1½	35	15½
1-3	65½	54½	2	34½	15

Lap Weld					
Steel			Iron		
In.	Blk.	Galv.	In.	Blk.	Galv.
2	58	46½	1¼	20	0¼
2½-3	61	49½	1½	25½	7
3½-6	63	51½	2	27½	9
7-8	62	49½	2½-3½	28½	11½
9-10	61½	49	4	30½	15
11-12	60½	48	4½-8	29½	14
			9-12	25½	9

Seamless					
Hot			Elec. Weld—		
Cold			Hot		
Rolled			Rolled		
O.D.	B.W.G.	Hot	O.D.	B.W.G.	Cold
1" sizes	13	\$9.90	1" sizes	13	\$9.65
1¼"	13	11.73	1¼"	13	11.43
1½"	13	12.96	1½"	13	12.64
1¾"	13	12.41	1¾"	13	12.10
2"	13	13.90	2"	13	13.53
2¼"	13	15.50	2¼"	13	15.06
2½"	12	17.07	2½"	12	16.57
2¾"	12	18.70	2¾"	12	18.11
3"	12	19.82	3"	12	19.17
3½"	12	20.79	3½"	12	20.05
4"	11	26.24	4"	11	25.30
4½"	10	32.56	4½"	10	31.32
5"	9	43.16	5"	9	41.29
5½"	9	49.96	5½"	9	47.96
6"	7	76.71	6"	7	74.14

Boiler Tubes: Net base prices per 100 feet fob Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.
 Pipe, Cast Iron: Class B, 6-in. and over, \$60 per net ton, Birmingham; \$65, Burlington, N. J.; \$62.80, del., Chicago; 4-in. pipe, \$5 higher. Class A pipe, \$3 a ton over class B.

Rails, Supplies

Standard rails, over 60-lb, fob mill, net ton, \$43.40. Light rails (billet), Pittsburgh, Chicago, Birmingham, net ton, \$49.18.

Relaying rails, 35 lb and over, fob railroad and basing points, \$31-\$33.

Supplies: Track bolts, 6 50c; heat treated, 6.75c. Tie plates \$51 net ton, base, Standard spikes, 6.50c.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago. Additional discounts: 5 for carloads; 10 for full containers, except tire, step and plow bolts.

(Ceiling prices advanced 12 per cent, effective July 27, 1946; discounts remain unchanged.)

Carriage and Machine		
¾ x 6 and smaller	Do., ¾ and ¾ x 6-in. and shorter	65½ off
Do., ¾ and ¾ x 6-in. and shorter	Do., ¾ and ¾ x 6-in. and shorter	63½ off
Do., ¾ and ¾ x 6-in. and shorter	Do., ¾ and ¾ x 6-in. and shorter	61 off
1½ and larger, all lengths		59 off
All diameters, over 6-in. long		59 off
Tire bolts		50 off
Step bolts		56 off
Flow bolts		85 off

Stove Bolts

In packages, nuts separate, 71-10 off, nuts attached, 71 off; bulk, 80 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts		U.S.S.	S.A.E.
¾-in. and smaller		62	64
¾-in. and smaller		62	64
¾-in. and smaller		62	64
¾-in. and smaller		62	64
¾-in. and smaller		62	64
¾-in. and smaller		62	64
¾-in. and smaller		62	64
¾-in. and smaller		62	64
¾-in. and smaller		62	64
¾-in. and smaller		62	64

Additional discount of 10 for full kegs.

Hexagon Cap Screws

Upset 1-in., smaller..... 64 off

Milled 1-in., smaller..... 60 off

Square Head Set Screws

Upset 1-in. and smaller..... 71 off

Headless, ¼-in. and larger..... 60 off

No. 10 and smaller..... 70 off

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham
 Structural ¾-in. and under..... 4.75c
 ½-in. and under..... 4.50c
 *Plus 12 per cent increase on base prices, effective July 26.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, 1cl..... \$2.75-\$3.00 off

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 15.15c; extra carbon 19.48c; special carbon 23.80c; oil-hardening 25.97c; high carbon-chromium 46.53c.

W	Cr.	V.	Mo.	Base, per lb.
18.00	4	1	...	72.49c
1.5	4	1	8.5	58.43c
6.40	4.15	1.90	3	58.43c
5.50	4.50	4	4.50	62.22c
				75.74c

Stainless Steels

Base, Cents per lb
CHROMIUM NICKEL STEELS

302	304	308	309	310	312	316	32
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WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras. Quotations based on mill prices announced March 1, 1946

	Hot-rolled bars	Structural shapes	Plates	Floor plates	Hot-rolled sheets (10-gage base)	Hot-rolled strip (14-gage and lighter, 6-in and narrower)	Hot-rolled strip (12-gage and heavier wider than 6-inch)	Galvanized flat sheets (24-gage base)	Cold-rolled sheets (17-gage base)	Cold-finished bars
Boston	4.356 ¹	4.203 ¹	4.203 ¹	6.039 ¹	4.050 ¹	5.548 ¹	4.418 ¹	5.725 ¹	5.031 ¹	4.656 ¹
New York	4.134 ¹	4.038 ¹	4.049 ¹	5.875 ¹	3.856 ¹	4.375 ¹	4.275 ¹	5.501 ¹	4.838 ¹	4.584 ¹
Jersey City	4.153 ¹	4.018 ¹	4.049 ¹	5.875 ¹	3.856 ¹	4.375 ¹	4.275 ¹	5.501 ¹	4.890 ¹	4.605 ¹
Philadelphia	4.114 ¹	3.937 ¹	3.875 ¹	5.564 ¹	3.774 ¹	4.664 ¹	4.554 ¹	5.493 ¹	5.138 ¹	4.594 ¹
Baltimore	4.093 ¹	4.05 ¹	3.865 ¹	5.543 ¹	3.64 ¹	4.293 ¹	4.193 ¹	5.365 ¹	5.113 ¹	4.543 ¹
Washington	4.232 ¹	4.22 ¹	4.067 ¹	5.632 ¹	3.842 ¹	4.432 ¹	4.332 ¹	5.667 ¹	5.007 ¹	4.532 ¹
Norfolk, Va.	4.377 ¹	4.303 ¹	4.262 ¹	5.777 ¹	4.037 ¹	4.927 ¹	4.477 ¹	5.862 ¹	4.552 ¹	4.677 ¹
Bethlehem, Pa.*		3.70 ¹								
Claymont, Del.*			3.70 ¹							
Coatesville, Pa.*			3.70 ¹							
Buffalo (city)	3.60 ¹	3.65 ¹	3.92 ¹	5.55 ¹	3.575 ¹	4.21 ¹	4.11 ¹	5.20 ¹	4.625 ¹	4.20 ¹
Buffalo (country)	3.50 ¹	3.55 ¹	3.55 ¹	5.15 ¹	3.475 ¹	3.85 ¹	3.750 ¹	5.10 ¹	4.525 ¹	4.10 ¹
Pittsburgh (city)	3.60 ¹	3.65 ¹	3.65 ¹	5.25 ¹	3.575 ¹	3.75 ¹	3.850 ¹	5.327 ¹	4.625 ¹	4.20 ¹
Pittsburgh (country)	3.50 ¹	3.55 ¹	3.55 ¹	5.15 ¹	3.475 ¹	3.85 ¹	3.750 ¹	5.10 ¹	4.525 ¹	4.10 ¹
Cleveland (city)	3.60 ¹	3.58 ¹	3.65 ¹	5.48 ¹	3.575 ¹	3.95 ¹	3.850 ¹	5.347 ¹	4.625 ¹	4.20 ¹
Cleveland (country)	3.50 ¹		3.55 ¹		3.475 ¹	3.85 ¹	3.750 ¹		4.525 ¹	4.10 ¹
Detroit	3.70 ¹	3.952 ¹	3.90 ¹	5.572 ¹	3.675 ¹	4.050 ¹	3.950 ¹	5.491 ¹	4.725 ¹	4.25 ¹
Omaha (city, del.)	4.32 ¹	4.37 ¹	4.37 ¹	5.97 ¹	4.045 ¹	4.52 ¹	4.42 ¹	6.00 ¹	5.72 ¹	4.945 ¹
Omaha (country)	4.22 ¹	4.27 ¹	4.27 ¹	5.87 ¹	3.945 ¹	4.42 ¹	4.32 ¹	5.90 ¹		
Cincinnati	3.902 ¹	3.983 ¹	3.952 ¹	5.583 ¹	3.671 ¹	4.046 ¹	3.946 ¹	5.296 ¹	4.271 ¹	4.602 ¹
Youngstown*								4.85 ¹		
Middletown, O.*					3.475 ¹	3.95 ¹	3.750 ¹	5.10 ¹		
Chicago (city)	3.75 ¹	3.80 ¹	3.80 ¹	5.40 ¹	3.675 ¹	3.95 ¹	3.850 ¹	15.40 ¹	4.425 ¹	4.20 ¹
Milwaukee	3.908 ¹	3.953 ¹	3.953 ¹	5.553 ¹	3.433 ¹	4.108 ¹	4.008 ¹	15.553 ¹	4.583 ¹	4.358 ¹
Indianapolis	3.83 ¹	3.88 ¹	3.88 ¹	5.48 ¹	3.743 ¹	4.118 ¹	4.018 ¹	5.368 ¹	4.793 ¹	4.43 ¹
St. Paul	4.092 ¹	4.142 ¹	4.142 ¹	5.742 ¹	3.817 ¹	4.292 ¹	4.192 ¹	5.666 ¹	4.767 ¹	4.452 ¹
St. Louis	3.918 ¹	3.968 ¹	3.968 ¹	5.568 ¹	3.643 ¹	4.118 ¹	4.018 ¹	5.622 ¹	4.593 ¹	4.32 ¹
Memphis, Tenn.	4.296 ¹	4.346 ¹	4.346 ¹	6.071 ¹	4.221 ¹	4.596 ¹	4.496 ¹	5.746 ¹		4.82 ¹
Birmingham	3.75 ¹	3.80 ¹	3.80 ¹	6.153 ¹	3.675 ¹	4.05 ¹	4.05 ¹	5.20 ¹	5.077 ¹	4.99 ¹
New Orleans (city)	4.358 ¹	4.408 ¹	4.408 ¹	6.329 ¹	4.283 ¹	4.653 ¹	4.553 ¹	5.808 ¹	5.304 ¹	5.079 ¹
Houston, Tex.	4.00 ¹	4.50 ¹	4.50 ¹	5.75 ¹	3.988 ¹	4.668 ¹	4.568 ¹	5.763 ¹	5.819 ¹	4.10 ¹
Los Angeles	4.65 ¹	4.90 ¹	5.20 ¹	7.45 ¹	5.225 ¹	5.30 ¹	5.200 ¹	6.55 ¹	7.425 ¹	6.033 ¹
San Francisco	4.20 ¹	4.15 ¹	4.15 ¹	5.85 ¹	4.125 ¹	5.35 ¹	4.50 ¹	6.35 ¹	6.875 ¹	5.783 ¹
Portland, Oreg.	4.70 ¹	4.70 ¹	5.00 ¹	6.75 ¹	4.875 ¹	6.65 ¹	5.000 ¹	6.20 ¹	6.825 ¹	5.983 ¹
Tacoma, Wash.	4.60 ¹	4.70 ¹	5.00 ¹	6.75 ¹	4.87 ¹	5.80 ¹	4.60 ¹	6.40 ¹	6.55 ¹	6.23 ¹
Seattle	4.60 ¹	4.70 ¹	5.00 ¹	6.75 ¹	4.87 ¹	5.80 ¹	4.60 ¹	6.40 ¹	6.55 ¹	6.23 ¹

*Basing point cities with quotations representing mill prices, plus warehouse spread; †open market price.

BASE QUANTITIES

¹—400 to 1999 pounds; ²—400 to 14,999 pounds; ³—any quantity; ⁴—300 to 1999 pounds; ⁵—400 to 8999 pounds; ⁶—300 to 9999 pounds; ⁷—400 to 39,999 pounds; ⁸—under 2000 pounds; ⁹—under 4000 pounds; ¹⁰—500 to 1499 pounds; ¹¹—one bundle to 39,999 pounds; ¹²—150 to 2249 pounds; ¹³—150 to 1499 pounds; ¹⁴—three to 24 bundles; ¹⁵—450

to 1499 pounds; ¹⁶—one bundle to 1499 pounds; ¹⁷—one to nine bundles; ¹⁸—one to six bundles; ¹⁹—100 to 749 pounds; ²⁰—300 to 1999 pounds; ²¹—1500 to 39,999 pounds; ²²—1500 to 1999 pounds; ²³—100 to 39,999 pounds; ²⁴—400 to 1499 pounds; ²⁵—1000 to 1999 pounds; ²⁶—under 25 bundles; Cold-rolled strip, 2000 to 39,999 pounds, ²⁷—300 to 4999 pounds.

ORES

Lake Superior Iron Ore	
Gross ton, 51 1/4% (Natural)	
Lower Lake Ports	
Old range bessemer	\$5.45
Mesabi nonbessemer	5.05
High phosphorus	5.05
Mesabi bessemer	5.20
Old range nonbessemer	5.30

Eastern Local Ore	
Cents, units, del. E. Pa.	
Foundry and basic 56-63% contract	18.00

Foreign Ore	
Cents per unit, cif Atlantic ports	
Manganiferous ore, 45-55% Fe, 8-10% Mn.	Nom.
N. African low phos.	Nom.
Swedish basic, 60 to 68% Spanish, N. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro	7.50-8.00

Tungsten Ore	
Chinese Wolframite, per short ton unit, duty paid	\$24.00

Chrome Ore	
Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash.	

(3% paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	\$39.75
48% 3:1	41.00
48% no ratio	31.00

South African (Transvaal)	
44% no ratio	\$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80

Brazilian—nominal	
44% 2.5:1 lump	\$33.65
48% 3:1 lump	43.50

Rhodesian	
45% no ratio	\$28.30
45% no ratio	31.00
48% 3:1 lump	41.00

Domestic (seller's nearest rail)	
48% 3:1	\$43.50
less \$7 freight allowance.	

Manganese Ore	
Sales prices of Office of Metals Reserve, cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85c; Fontana, Calif., Provo,	

Utah, and Pueblo, Colo., 91c; include duty on imported ore are subject to established penalties and other provisions. at basing points which are points of discharge of imported ore are in fob cars, shipped dock most favorable to the buyer. Outside shipments direct to buyers at 15c to 17c per unit than Metal Reserve prices.

Molybdenum	
Sulphide conc., lb., Mo. cont. mines	

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Chemical Composition Limits, Per Cent										Basic open-hearth Electric fu		
Designation	Carbon	Mn	Si	Cr	Ni	Mo	Bars per 100 lb.	Billets per GT	Bars per 100 lb.			
NE 9415	.13-.18	.80-1.10	.20-.35	.80-.50	.30-.60	.08-.15	\$0.812	\$16.230	\$1.353	\$2.000		
NE 9425	.23-.28	.80-1.20	.20-.35	.80-.50	.30-.60	.08-.15	.812	16.230	1.353	2.000		
NE 9442	.40-.45	1.00-1.30	.20-.35	.80-.50	.30-.60	.08-.15	.886	17.312	1.407	2.000		
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.703	14.066	1.244	2.000		
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.298	25.968	1.677	2.000		
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.298	25.968	1.677	2.000		

Extras are in addition to a base price of 2.921c, per pound on finished products and \$58.43 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices on vanadium alloy.

Pig Iron

Maximum prices per gross ton fixed by OPA schedule No. 10, last amended July 27, 1945; \$2 increase may be charged on adjustable pricing contracts made between May 29 and July 27. Delivered prices do not include 3 per cent federal tax, effective Dec. 1, 1942.

	No. 2 Foundry	Basic	Bessemer	Malleable
ethlehem, Pa., base	\$29.50	\$29.00	\$30.50	\$30.00
Newark, N. J., del.	31.20	30.70	32.20	31.70
Brooklyn, N. Y., del.	32.28			32.78
Irishboro, Pa., base	29.50	29.00	30.50	30.00
Irishboro, base	24.88	23.50	29.50	
Baltimore, del.	30.22			
Boston, del.	29.68			
Chicago, del.	28.72			
Cincinnati, del.	28.94	28.06		
Cleveland, del.	28.62	27.74		
Philadelphia, N. J., del.	30.82			
St. Louis, del.	30.05	29.55		
St. Paul, del.	28.62	29.54		
St. Paul, base	28.50	27.60	29.50	
Boston, del.	30.06		31.06	30.56
Rochester, del.	30.03		31.03	30.53
Syracuse, del.	30.58		31.58	31.08
St. Paul, base	28.50	28.00	29.00	28.50
Milwaukee, del.	29.73	29.23	30.23	29.73
Muskegon, Mich., del.	32.05			32.05
Cleveland, base	28.50	28.00	29.00	28.50
Akron, Canton, del.	30.04	29.54	30.54	30.04
St. Paul, base	28.50	28.00	29.00	28.50
Saginaw, Mich., del.	30.81	30.31	31.31	30.81
St. Paul, base	29.00	28.50	29.50	29.00
St. Paul, del.	31.13	30.63	31.63	31.13
St. Paul, base	28.50	28.00	29.00	28.50
St. Paul, base	29.50	29.00	30.00	29.50
Boston, del.	30.06	29.56	31.06	30.56
St. Paul, del.	28.50	28.00	29.00	28.50
St. Paul, del.	29.00	28.50		29.00
St. Paul, del.	28.50	28.00		28.50
Cincinnati, del.	29.68	29.18		29.68
St. Paul, del.	28.50	28.00		28.50
Pittsburgh, del.	29.27	28.77		29.27
St. Paul, base	28.50	28.00		28.50
St. Paul, base	28.50	28.00		28.50
St. Paul, base	29.50	29.00		29.50
Baltimore, del.	30.60			
St. Paul, base		29.00		
St. Paul, base	29.50	29.00	30.50	30.00
Philadelphia, del.	30.43	29.93		30.93
St. Paul, base	28.50	28.00		28.50
St. Paul, base	28.50	28.00		28.50
St. Paul, base	30.66	30.16	31.16	30.66

To Neville Island base add: \$1c for McKees Rocks, Pa.; 93c for Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa; (water), Monongahela; \$1.24, Oakmont, Verona; \$1.38, Brackenridge.

Exceptions to above prices: Struthers Iron & Steel Co., Struthers, O., charge 50 cents a ton in excess of basing point prices for No. 2, basic, Bessemer and malleable pig iron, Republic Steel Corp., charge \$2 a ton higher for foundry and basic pig iron on the Birmingham base.

High Silicon, Silvery

6.00-6.50 per cent (base) ...	\$34.00
6.51-7.00 ...	\$35.00
7.01-7.50 ...	\$36.00
7.51-8.00 ...	\$37.00
8.01-8.50 ...	\$38.00
8.51-9.00 ...	\$39.00
Fob Jackson county, O., per gross ton; Buffalo base \$1.25 higher.	

Buyer may use whichever base is more favorable.

Electric Furnace Ferro-silicon: Si 14.01 to 14.50%, \$50 Jackson co.; each additional 0.50% silicon up to and including 18% add \$1; low impurities not exceeding 0.005 P, 0.40 Si, 1.0% C, add \$1.

Bessemer Ferro-silicon

Prices same as for high silicon silvery iron, plus \$1 per gross ton.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn., \$33.00. (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa.	\$28.00
Valley base	\$28.00

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo, N. Y., \$34.00 base; \$35.38, del., Philadelphia. Intermediate phosphorus, Central Furnace, Cleveland, \$31.00.

Differentials

Basing point prices are subject to following differentials: Silicon: An additional charge not to exceed 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%). Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over. Manganese: An additional charge not to exceed 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%. Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, \$2 a ton; for each additional 0.25% nickel, \$1 a ton.

Refractories

Per 1000, fob shipping point. Net prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	\$81.00
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High Heat Duty

Pa., Ill., Md., Mo., Ky.	65.00
Ala., Ga.	65.00
N. J.	70.00

Intermediate Heat Duty

Ohio	57.00
Pa., Ill., Md., Mo., Ky.	59.00
Ala., Ga.	51.00
N. J.	62.00

Low Heat Duty

Pa., Md., Ohio	51.00
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Malleable Bung Brick

All bases	75.00
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Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press	42.00
Wire Cut	40.00

Silica Brick

Pennsylvania	65.00
Joliet, E. Chicago	74.00
Birmingham, Ala.	65.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.	
Bulk	22.00
Bags	26.00

Basic Brick

Net ton, fob Baltimore, Plymouth Meeting, Chester, Pa.	
Chrome brick	54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite ..	65.00

Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net ton, carloads, effective CaF₂ content, 70% or more, \$33; 65% to 70%, \$32; 60% to 65%, \$31; less than 60%, \$30.

Ferroalloy Prices

Carload: 19-21% carlot per gross ton, Palmerton, Pa., \$36; \$40.50; Chicago, \$40.60; Monaca, standard: 78-82% gross ton, duty paid, \$135 fob Baltimore, Philadelphia or New York, whichever is most favorable buyer, Rockdale or Rockwood, Pa. (where Tennessee Products is producer), Birmingham, Ala. (where Sloss-Sheffield Steel & Iron is producer); \$140 fob cars, \$135 fob cars, \$130 fob cars, \$125 fob cars, \$120 fob cars, \$115 fob cars, \$110 fob cars, \$105 fob cars, \$100 fob cars, \$95 fob cars, \$90 fob cars, \$85 fob cars, \$80 fob cars, \$75 fob cars, \$70 fob cars, \$65 fob cars, \$60 fob cars, \$55 fob cars, \$50 fob cars, \$45 fob cars, \$40 fob cars, \$35 fob cars, \$30 fob cars, \$25 fob cars, \$20 fob cars, \$15 fob cars, \$10 fob cars, \$5 fob cars, \$0 fob cars. Prices are pound contained Mn, bulk car shipments, fob shipping point, net allowed. Special low-carbon content of 90% Mn, 0.10% C, 0.06% P.

Manganese Briquets: (Weight 3 lb and containing exactly 1 lb Mn) per lb of briquets. Containing 0.065% Mn, 0.065% C, 0.065% P, freight allowed: 0.065% Mn, 0.075% C, 0.075% P, central; 0.065% Mn, 0.085% C, 0.085% P, spot; 0.065% Mn, 0.095% C, 0.095% P, spot; 0.065% Mn, 0.105% C, 0.105% P, spot; 0.065% Mn, 0.115% C, 0.115% P, spot; 0.065% Mn, 0.125% C, 0.125% P, spot; 0.065% Mn, 0.135% C, 0.135% P, spot; 0.065% Mn, 0.145% C, 0.145% P, spot; 0.065% Mn, 0.155% C, 0.155% P, spot; 0.065% Mn, 0.165% C, 0.165% P, spot; 0.065% Mn, 0.175% C, 0.175% P, spot; 0.065% Mn, 0.185% C, 0.185% P, spot; 0.065% Mn, 0.195% C, 0.195% P, spot; 0.065% Mn, 0.205% C, 0.205% P, spot; 0.065% Mn, 0.215% C, 0.215% P, spot; 0.065% Mn, 0.225% C, 0.225% P, spot; 0.065% Mn, 0.235% C, 0.235% P, spot; 0.065% Mn, 0.245% C, 0.245% P, spot; 0.065% Mn, 0.255% C, 0.255% P, spot; 0.065% Mn, 0.265% C, 0.265% P, spot; 0.065% Mn, 0.275% C, 0.275% P, spot; 0.065% Mn, 0.285% C, 0.285% P, spot; 0.065% Mn, 0.295% C, 0.295% P, spot; 0.065% Mn, 0.305% C, 0.305% P, spot; 0.065% Mn, 0.315% C, 0.315% P, spot; 0.065% Mn, 0.325% C, 0.325% P, spot; 0.065% Mn, 0.335% C, 0.335% P, spot; 0.065% Mn, 0.345% C, 0.345% P, spot; 0.065% Mn, 0.355% C, 0.355% P, spot; 0.065% Mn, 0.365% C, 0.365% P, spot; 0.065% Mn, 0.375% C, 0.375% P, spot; 0.065% Mn, 0.385% C, 0.385% P, spot; 0.065% Mn, 0.395% C, 0.395% P, spot; 0.065% Mn, 0.405% C, 0.405% P, spot; 0.065% Mn, 0.415% C, 0.415% P, spot; 0.065% Mn, 0.425% C, 0.425% P, spot; 0.065% Mn, 0.435% C, 0.435% P, spot; 0.065% Mn, 0.445% C, 0.445% P, spot; 0.065% Mn, 0.455% C, 0.455% P, spot; 0.065% Mn, 0.465% C, 0.465% P, spot; 0.065% Mn, 0.475% C, 0.475% P, spot; 0.065% Mn, 0.485% C, 0.485% P, spot; 0.065% Mn, 0.495% C, 0.495% P, spot; 0.065% Mn, 0.505% C, 0.505% P, spot; 0.065% Mn, 0.515% C, 0.515% P, spot; 0.065% Mn, 0.525% C, 0.525% P, spot; 0.065% Mn, 0.535% C, 0.535% P, spot; 0.065% Mn, 0.545% C, 0.545% P, spot; 0.065% Mn, 0.555% C, 0.555% P, spot; 0.065% Mn, 0.565% C, 0.565% P, spot; 0.065% Mn, 0.575% C, 0.575% P, spot; 0.065% Mn, 0.585% C, 0.585% P, spot; 0.065% Mn, 0.595% C, 0.595% P, spot; 0.065% Mn, 0.605% C, 0.605% P, spot; 0.065% Mn, 0.615% C, 0.615% P, spot; 0.065% Mn, 0.625% C, 0.625% P, spot; 0.065% Mn, 0.635% C, 0.635% P, spot; 0.065% Mn, 0.645% C, 0.645% P, spot; 0.065% Mn, 0.655% C, 0.655% P, spot; 0.065% Mn, 0.665% C, 0.665% P, spot; 0.065% Mn, 0.675% C, 0.675% P, spot; 0.065% Mn, 0.685% C, 0.685% P, spot; 0.065% Mn, 0.695% C, 0.695% P, spot; 0.065% Mn, 0.705% C, 0.705% P, spot; 0.065% Mn, 0.715% C, 0.715% P, spot; 0.065% Mn, 0.725% C, 0.725% P, spot; 0.065% Mn, 0.735% C, 0.735% P, spot; 0.065% Mn, 0.745% C, 0.745% P, spot; 0.065% Mn, 0.755% C, 0.755% P, spot; 0.065% Mn, 0.765% C, 0.765% P, spot; 0.065% Mn, 0.775% C, 0.775% P, spot; 0.065% Mn, 0.785% C, 0.785% P, spot; 0.065% Mn, 0.795% C, 0.795% P, spot; 0.065% Mn, 0.805% C, 0.805% P, spot; 0.065% Mn, 0.815% C, 0.815% P, spot; 0.065% Mn, 0.825% C, 0.825% P, spot; 0.065% Mn, 0.835% C, 0.835% P, spot; 0.065% Mn, 0.845% C, 0.845% P, spot; 0.065% Mn, 0.855% C, 0.855% P, spot; 0.065% Mn, 0.865% C, 0.865% P, spot; 0.065% Mn, 0.875% C, 0.875% P, spot; 0.065% Mn, 0.885% C, 0.885% P, spot; 0.065% Mn, 0.895% C, 0.895% P, spot; 0.065% Mn, 0.905% C, 0.905% P, spot; 0.065% Mn, 0.915% C, 0.915% P, spot; 0.065% Mn, 0.925% C, 0.925% P, spot; 0.065% Mn, 0.935% C, 0.935% P, spot; 0.065% Mn, 0.945% C, 0.945% P, spot; 0.065% Mn, 0.955% C, 0.955% P, spot; 0.065% Mn, 0.965% C, 0.965% P, spot; 0.065% Mn, 0.975% C, 0.975% P, spot; 0.065% Mn, 0.985% C, 0.985% P, spot; 0.065% Mn, 0.995% C, 0.995% P, spot; 0.065% Mn, 1.005% C, 1.005% P, spot; 0.065% Mn, 1.015% C, 1.015% P, spot; 0.065% Mn, 1.025% C, 1.025% P, spot; 0.065% Mn, 1.035% C, 1.035% P, spot; 0.065% Mn, 1.045% C, 1.045% P, spot; 0.065% Mn, 1.055% C, 1.055% P, spot; 0.065% Mn, 1.065% C, 1.065% P, spot; 0.065% Mn, 1.075% C, 1.075% P, spot; 0.065% Mn, 1.085% C, 1.085% P, spot; 0.065% Mn, 1.095% C, 1.095% P, spot; 0.065% Mn, 1.105% C, 1.105% P, spot; 0.065% Mn, 1.115% C, 1.115% P, spot; 0.065% Mn, 1.125% C, 1.125% P, spot; 0.065% Mn, 1.135% C, 1.135% P, spot; 0.065% Mn, 1.145% C, 1.145% P, spot; 0.065% Mn, 1.155% C, 1.155% P, spot; 0.065% Mn, 1.165% C, 1.165% P, spot; 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0.065% Mn, 1.735% C, 1.735% P, spot; 0.065% Mn, 1.745% C, 1.745% P, spot; 0.065% Mn, 1.755% C, 1.755% P, spot; 0.065% Mn, 1.765% C, 1.765% P, spot; 0.065% Mn, 1.775% C, 1.777% P, spot; 0.065% Mn, 1.785% C, 1.785% P, spot; 0.065% Mn, 1.795% C, 1.795% P, spot; 0.065% Mn, 1.805% C, 1.805% P, spot; 0.065% Mn, 1.815% C, 1.815% P, spot; 0.065% Mn, 1.825% C, 1.825% P, spot; 0.065% Mn, 1.835% C, 1.835% P, spot; 0.065% Mn, 1.845% C, 1.845% P, spot; 0.065% Mn, 1.855% C, 1.855% P, spot; 0.065% Mn, 1.865% C, 1.865% P, spot; 0.065% Mn, 1.875% C, 1.877% P, spot; 0.065% Mn, 1.885% C, 1.885% P, spot; 0.065% Mn, 1.895% C, 1.895% P, spot; 0.065% Mn, 1.905% C, 1.905% P, spot; 0.065% Mn, 1.915% C, 1.915% P, spot; 0.065% Mn, 1.925% C, 1.925% P, spot; 0.065% Mn, 1.935% C, 1.935% P, spot; 0.065% Mn, 1.945% C, 1.945% P, spot; 0.065% Mn, 1.955% C, 1.955% P, spot; 0.065% Mn, 1.965% C, 1.965% P, spot; 0.065% Mn, 1.975% C, 1.977% P, spot; 0.065% Mn, 1.985% C, 1.985% P, spot; 0.065% Mn, 1.995% C, 1.995% P, spot; 0.065% Mn, 2.005% C, 2.005% P, spot; 0.065% Mn, 2.015% C, 2.015% P, spot; 0.065% Mn, 2.025% C, 2.025% P, spot; 0.065% Mn, 2.035% C, 2.035% P, spot; 0.065% Mn, 2.045% C, 2.045% P, spot; 0.065% Mn, 2.055% C, 2.055% P, spot; 0.065% Mn, 2.065% C, 2.065% P, spot; 0.065% Mn, 2.075% C, 2.077% P, spot; 0.065% Mn, 2.085% C, 2.085% P, spot; 0.065% Mn, 2.095% C, 2.095% P, spot; 0.065% Mn, 2.105% C, 2.105% P, spot; 0.065% Mn, 2.115% C, 2.115% P, spot; 0.065% Mn, 2.125% C, 2.125% P, spot; 0.065% Mn, 2.135% C, 2.135% P, spot; 0.065% Mn, 2.145% C, 2.145% P, spot; 0.065% Mn, 2.155% C, 2.155% P, spot; 0.065% Mn, 2.165% C, 2.165% P, spot; 0.065% Mn, 2.175% C, 2.177% P, spot; 0.065% Mn, 2.185% C, 2.185% P, spot; 0.065% Mn, 2.195% C, 2.195% P, spot; 0.065% Mn, 2.205% C, 2.205% P, spot; 0.065% Mn, 2.215% C, 2.215% P, spot; 0.065% Mn, 2.225% C, 2.225% P, spot; 0.065% Mn, 2.235% C, 2.235% P, spot; 0.065% Mn, 2.245% C, 2.245% P, spot; 0.065% Mn, 2.255% C, 2.255% P, spot; 0.065% Mn, 2.265% C, 2.265% P, spot; 0.065% Mn, 2.275% C, 2.277% P, spot; 0.065% Mn, 2.285% C, 2.285% P, spot; 0.065% Mn, 2.295% C, 2.295% P, spot;

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) contract, any quantity, 45c. eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Calcium metal: cast; Contract ton lots or more \$1.35, less \$1.60, pound of metal; \$1.36 and \$1.61 central, \$1.40 and \$1.65, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.50c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up 0.25c.

Calcium-Silicon: (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb. of alloy. Contract, carlots, lump 13.00c, ton lots 14.50c, less 15.50c eastern, freight allowed; 13.50c, 15.25c and 16.25c, central; 15.55c, 17.40c and 18.40c, western; spot up 0.25c.

Silicon Metal: Min. 97% Si and max. 1% Fe; eastern zone, bulk, c.i., 12.90c; 2000 lb to c.i., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% Si and max. 2% Fe, eastern, bulk; c.i., 12.50c, 2000 lb to c.i., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c, fob shipping point, freight allowed. Price per lb contained Si.

Silicomanganese: containing exactly 2 lb. Mn and about 1/2 lb. Si, eastern zone, bulk, c.i. 5.80c, ton lots 6.35c;

central zone, add 0.25c for c.i. and 1c for ton lots; western, add 0.55c for c.i. and 0.20c for ton lots. **Ferro-silicon:** weighing about 5 lb. and containing exactly 2 lb. Si, or about 2 1/2 lb. and containing exactly 1 lb. Si, packed, eastern zone, c.i. 3.90c, ton lots 4.15c, less ton lots 4.45c; central zone, add 0.15c for c.i. and 0.40c for smaller lots; western zone, add 0.30c for c.i. and 0.45c for smaller lots. Prices are fob shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.30c for bulk carlots.

Manganese Metal: (Min. 96% Mn, max. 2% Fe), per lb of metal, eastern zone, bulk, c.i., 30c, 2000 lb to c.i., 32c, central, 30.25c, and 33c; western, 30.55c and 35.05c. **Electrolytic Manganese:** 99.97% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more. Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1/4c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) per lb of alloy. Contract ton lots, \$1.89, less \$2.01, eastern; freight allowed; \$1.903 and \$2.023, central, \$1.935 and \$2.055 western; spot up 5c. **Nickel-Boron:** (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance), per lb of alloy. Contract, 5 tons or more, \$1.90, 1 ton to 8 ton, \$2.00, less than ton \$2.10, eastern, freight allowed; \$1.9125, \$2.0125 and \$2.1125, central; \$1.9445, \$2.0445 and \$2.1445, western; spot same as contract.

Borosi: 3 to 4% B, 40 to 45% Si, \$6.25 lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Boriam: B 1.5-1.9%, ton lots, 45c lb; less-ton lots, 50c lb. **Carbortam:** B 0.90 to 1.15% net ton to carload, 8c per lb fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferro-titanium. **Silicess Alloy:** (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%), per lb of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed, 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up 0.25c.

Silvaz Alloy: (Si 35-40%, Va 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%), per lb of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up 0.25c.

SMZ Alloy: (Si 60-55%, Mn 5-7%, Zr 5-7% and Fe approx. 20% (per lb of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up 0.25c.

CM5Z Alloy 4: (Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75% and C 3.00-4.50%). Contract carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up 0.25c.

CM5Z Alloy 5: (Cr 50-56%, Mn

4-6%, Si 13.50-16.00%, Zr 0.125%, C 3.50-5.00%) per lb alloy. Contract, carlots, bulk, 10.75c, 11.25c, ton lots 11.75c, 12.25c, eastern, freight allowed 11.25c, 11.75c, 12.50c and 13.00c central; 13.25c and 13.75c, 14.50c, 15.00c, western; spot up 0.25c. **Zirconium Alloy:** Zr 12-15%, per lb of alloy, eastern contract, carlots, 4.60c, packed 4.80c, ton 4.80c, less tons 5c, carloads, by per gross ton \$102.50; pac \$107.50; ton lots \$108; less-ton \$112.50. Spot up \$5 per ton. **Zirconium Alloy:** Zr 35-40%, eastern contract basis, carloads in bulk package, per lb of alloy 14 gross ton lots 15.00c; less-ton 16.00c. Spot up 1/4c.

Alsiar: (Approx. 20% Al, 40% 40% Fe) contract basis fob Niagara Falls, N. Y., lump per lb 5.89c; lots 6.38c; less 6.88c. Spot up **Simalal:** (Approx. 20% each Mn, Al) Contract, freight not exceeding St. Louis rate allowed, lb alloy; carlots 8c; ton lots 8.1c; less-ton lots 9.25c.

Tungsten Metal Powder: Spot, less than 97%, \$2.50-\$2.60; fob allowed as far west as St. Louis.

Grainal: Vanadium Grainal No. 87.5c, No. 6, 60c; No. 79, 45c; fob Bridgeville, Pa., usual free allowance.

Vanadium Pentoxide, technical grade: Fused, approx. 89-92% V and 5.94% Na₂O, or air dried, 85% V₂O₅ and 5.15% Na₂O, \$ per lb contained V₂O₅, fob Philadelphia freight allowed on quantities of lb and over to St. Louis.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)	
No. 1 Heavy Melt, Steel	\$18.75
No. 2 Heavy Melt, Steel	18.75
No. 2 Bundles	18.75
No. 3 Bundles	16.75
Mixed Borings, Turnings	13.75
Machine Shop Turnings	13.75
Billet, Forge Crops	23.75
Bar Crops, Plate Scrap	21.25
Cast Steel	21.25
Punchings	21.25
Elec. Furnace Bundles	19.75
Heavy Turnings	18.25

Cast Grades

(Fob Shipping Point)	
Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:

(Dealers' buying prices)	
No. 1 Heavy Melt, Steel	\$15.33
No. 2 Heavy Melt, Steel	15.33
No. 2 Hyd. Bundles	15.33
No. 3 Hyd. Bundles	13.33
Chemical Borings	14.83
Machine Turnings	10.33
Mixed Borings, Turnings	10.33
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstripped Motor Blocks	17.50
Stove Plate	19.00

BOSTON:

(Fob shipping points, Boston differential 99c higher, steelmaking grades; Providence, \$1.09 higher)	
No. 1 Heavy Melt, Steel	\$14.06
No. 2 Heavy Melt, Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	14.06
No. 1 Busheling	14.06
Machine Shop Turnings	9.06
Mixed Borings, Turnings	9.06
Short Shovel Turnings	11.06
Chemical Borings	13.31
Low Phos. Clippings	16.56
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

BUFFALO:

(Delivered consumers' plant)	
No. 1 Heavy Melt, Steel	\$19.25
No. 2 Heavy Melt, Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25

No. 1 Busheling	19.25
Machine Turnings	14.25
Short Shovel Turnings	16.25
Mixed Borings, Turnings	14.25
Cast Iron Borings	15.25
No. 1 Cast	20.00
Low Phos.	21.75

PITTSBURGH:

(Delivered consumers' plant)	
Railroad Heavy Melting	\$21.00
No. 1 Heavy Melt, Steel	20.00
No. 2 Heavy Melt, Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Mach. Shop Turnings	15.00
Mixed Borings, Turnings	15.00
No. 1 Cupola Cast	\$20.00
Heavy Breakable Cast	*16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	22.00
* Shipping point.	

CLEVELAND:

(Delivered consumers' plant)	
No. 1 Heavy Melt, Steel	\$19.50
No. 2 Heavy Melt, Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	14.50
Short Shovel Turnings	16.50
Mixed Borings, Turnings	14.50
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	13.50-14.00
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec. Furnace Bundles	20.50

VALLEY:

(Delivered consumer's plant)	
No. 1 R.R. Heavy Melt	\$21.00
No. 1 Heavy Melt, Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Cast Iron Borings	16.00
Machine Shop Turnings	15.00
Low Phos. Plate	22.50

MANSFIELD:

(Delivered consumer's plant)	
Machine Shop Turnings	\$15.00

CINCINNATI:

(Delivered consumer's plant)	
No. 1 Heavy Melt, Steel	\$19.50

No. 2 Heavy Melt, Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
Machine Turnings	10.50-11.00
Shoveling Turnings	12.50-13.00
Cast Iron Borings	11.50-12.00
Mixed Borings, Turnings	10.50-11.00
No. 1 Cupola Cast	20.00
Breakable Cast	16.50
Low Phosphorus	21.00-22.00
Scrap Rails	20.50-21.00
Stove Plate	18.50-19.00

DETROIT:

(Delivered consumer's plant)	
Heavy Melting Steel	\$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	12.32
Short Shovel, Turnings	14.32
Cast Iron Borings	13.32
Low Phos. Plate	19.80
No. 1 Cast	20.00
Heavy Breakable Cast	16.50

CHICAGO:

(Delivered consumer's plant; cast grades fob shipping point; railroad grades fob tracks)	
No. 1 Heavy Melt, Steel	\$19.75
No. 1 Heavy Melt, Steel	18.75
No. 2 Heavy Melt, Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dir. Bundles	18.75
Baled Mach. Shop Turn.	18.75
No. 3 Galv. Bundles	16.75
Machine Turnings	13.75
Mix. Borings, Sht. Turn.	13.75
Short Shovel Turnings	15.75
Cast Iron Borings	14.75
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Re-rolling Rails	22.25
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00

ST. LOUIS:

(Delivered consumer's plant; cast grades fob shipping point)	
Heavy Melting	\$17.50
No. 1 Locomotive Tires	21.00
Misc. Rails	22.00
Railroad Springs	17.50
Bundled Sheets	17.00
Axle Turnings	10.50
Machine Turnings	12.50
Shoveling Turnings	21.00
Re-rolling Rails	

Street Car Axles	
Steel Rails, 3 ft.	
Steel Angles	
Cast Iron Wheels	
No. 1 Cupola Cast	
Charging Box Cast	
Railroad Malleable	
Breakable Cast	
Stove Plate	
Grate Bars	
Brake Shoes	

BIRMINGHAM:

(Delivered consumer's plant)	
Billet Forge Crops	
Structural, Plate Scrap	
Scrap Rails Random	
Re-rolling Rails	
Angle Splice Bars	
Solid Steel Axles	
Cupola Cast	
Stove Plate	
Long Turnings	
Cast Iron Borings	
Iron Car Wheels	

LOS ANGELES:

(Delivered consumer's plant)	
No. 1 Heavy Melt, Steel	
No. 2 Heavy Melt, Steel	
No. 1, 2 Dir. Bundles	
Machine Turnings	
Mixed Borings, Turnings	
No. 1 Cast	

SAN FRANCISCO:

(Delivered consumer's plant)	
No. 1 Heavy Melt, Steel	
No. 2 Heavy Melt, Steel	
No. 1 Busheling	
No. 1, No. 2 Bundles	
No. 3 Bundles	
Machine Turnings	
Billet, Forge Crops	
Bar Crops, Plate	
Cast Steel	
Cut, Structural, Plate	
1 ft and under	
Alloy-free Turnings	
Tin Can Bundles	
No. 2 Steel Wheels	
Iron, Steel Axles	
No. 2 Cast Steel	
Uncut Frogs, Switches	
Scrap Rails	
Locomotive Tires	

SEATTLE:

(Delivered consumer's plant)	
No. 1 Heavy Melt, Steel	
No. 2 Heavy Melt, Steel	
Heavy Railroad Scrap	
(Fob shipping point)	
No. 1 Cupola Cast	

LOGEMANN

Presses for Sheet Scrap

THE NATION NEEDS YOUR SHEET SCRAP!

In mills, industrial plants and scrap yards, LOGEMANN SCRAP PRESSES are working day and night to prepare sheet scrap for the furnaces.

Sheet mills particularly recognize the value of the years of experience and the performance records which back up LOGEMANN designs and workmanship.

The line includes scrap presses *designed for mill Service*, presses *designed for automobile plant conditions*, presses *designed for general plant applications*. Write for details.

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3126 W. Burleigh St. Milwaukee, Wisconsin

The scrap press illustrated operates in one of the largest industrial plants. Compresses scrap from three directions to produce high-density mill size bundles. Built in various capacities.



NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 14.37½¢, del. Conn.; less carlots 14.50¢, refinery. Dealers may add ¼¢ for 5000 lb to carload; 1c, 1000-4999 lb; 1½¢, 500-999 lb; 2c, 0-499 lb. Casting, 14.12½¢, refinery, 20,000 lb or more; 14.37½¢, less than 20,000 lb.

Brass Ingot: 85-5-5 (No. 115) 15.50¢; 88-10-2 (No. 215) 18.75¢; 80-10-10 (No. 305) 18.25¢; No. 1 yellow (No. 405) 12.50¢; carlot prices, including 25¢ per 100 lb freight allowance; add ¼¢ for less than 20 tons.

Zinc: Prime western 8.25¢, select 8.85¢, brass special 8.50¢, intermediate 8.75¢, E. St. Louis; high grade 9.25¢, del., carlots. For 20,000 lb to carlots add 0.15¢; 10,000-20,000 lb 0.25¢; 2000-10,000 lb 0.4¢; under 2000 lb 0.50¢.

Lead: Common 8.10¢, chemical 8.20¢, corroding, 8.20¢, E. St. Louis for carlots; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester, Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00¢ del., pigs 14.00¢ del.; metallurgical 94% min. 13.50¢ del. Base 10,000 lb and over; add ¼¢ 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 12.75¢; No. 12 foundry alloy (No. 2 grade) 12.87½¢; steel deoxidizing grades, notch bars, granulated or shot; Grade 1 (95-97½%) 14.37½¢; grade 2 (92-95%) 13.25¢; grade 3 (90-92%) 12.00¢; grade 4 (85-90%) 11.37½¢. Above prices for 30,000 lb or more; add ¼¢ 10,000-30,000 lb; ½¢ 5000-10,000 lb; ¾¢ 1000-5000 lb; 1½¢ less than 1000 lb. Prices include freight at carload rate up to 75¢ per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lb) 20.50¢ per lb, carlots 22.50¢ 100 lb to c.i. Extruded 12-in. sticks 27.50¢, carlots; 29.50¢ 100 lb to c.i.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½¢ 1000-2239, 2½¢ 500-999, 3c under 500. Grade A, 99.8% or higher (includes Stralls), 52.00¢; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 51.87½¢; Grade C, 99.65-99.79% incl. 51.62½¢; Grade D, 99.50-99.64% incl., 51.50¢; Grade E, 99.49-99% incl. 51.12½¢; Grade F, below 99% (for tin content), 51.00¢.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50¢; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 15.00¢. On producers' sales add ¼¢ for less than carload to 10,000 lb; ½¢ for 9999-224 lb and 2c for 223 lb and less; on sales by dealers, distributors and jobbers add ¼¢, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, fob refinery 35.00¢ lb; pig and shot produced from electrolytic cathodes 36.00¢; "F" nickel shot or ingot for additions to cast iron, 34.00¢.

Mercury: Open market, spot, New York, \$98-\$100 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00¢ lb.

Beryllium-Copper: 3.75-4.25% Be, \$14.75 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms \$1.25 lb, del.; anodes, bulbs, discs and all other special or patented shapes, \$1.30.

Cobalt: 97-99%, \$1.50 lb, for 550 lb (bbl.); \$1.52 lb for 100 lb (case); \$1.57 lb under 100 lb.

Gold: U. S. Treasury, \$35 per ounce.

Indium: 99.9%, \$2.25 per troy ounce.

Silver: Open market, N. Y. 90.12½¢ per ounce.

Platinum: \$81.50 per ounce.

Palladium: \$24 per troy ounce.

Iridium: \$125 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 14.37½¢, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 25.81¢; yellow brass 23.67¢; commercial bronze, 95% 26.14¢, 90% 25.81¢; red brass, 85% 24.98¢, 80% 24.66¢; best quality 24.38¢; phosphor bronze, grade A 4% or 5%, 43.45¢; Everdur, Duronize or equiv., hot rolled, 30.88¢; naval brass 28.53¢; manganese bronze 31.99¢; muntz metal 26.78¢; nickel silver 5% 32.38¢.

Rods: Copper, hot rolled 22.16¢, cold drawn 23.16¢; yellow brass 18.53¢; commercial bronze, 95% 25.83¢, 90% 25.50¢; red brass, 85% 24.67¢; 80% 24.35¢; best quality 24.07¢; phosphor bronze, grade A 4% or 5% 43.70¢; Everdur, Duronize or equiv., cold drawn, 20.82¢; naval brass 22.59¢; manganese bronze 25.93¢; muntz metal 22.34¢; nickel silver 5% 34.44¢.

Seamless Tubing: Copper 25.85¢; yellow brass 26.43¢; commercial bronze 90% 28.22¢; red brass 85% 27.64¢, 80% 27.32¢; best quality brass 26.79¢; phosphor bronze, grade A 5% 44.70¢.

Copper Wire: Bare, soft, fob eastern mills, carlots 19.89¢, less carlots 20.39¢; weatherproof, fob eastern mills carlot 22.07¢, less carlots 22.57¢; magnet, delivered, carlots, 23.30¢, 15,000 lb or more 23.55¢, less carlots 24.05¢.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lb or more del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-19	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers: full sheets 11.25¢; cut sheets 11.50¢; pipe 9.90¢. New York, 10.00¢ Philadelphia, Baltimore, Rochester and Buffalo, 10.50¢ Chicago, Cleveland, Worcester and Boston.

Zinc Products: Sheet fob mill, 13.15¢, 36.000 lb and over deduct 7¢. Ribbon and strip 12.25¢, 3000-lb lots deduct 1¢, 6000 lb 2%, 9000 lb 3%, 18,000 lb 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00¢; 1-3 tons 12.00¢; 500-2000 lb 12.50¢; 100-500 lb 13.00¢; under 100 lb 14.00¢. Hull plate (over 12") add 1c to boiler plate prices.

PLATING MATERIALS

Chromic Acid: 99.75%, flake, del., carloads 18.25¢; 5 tons and over 16.75¢; 1-5 tons 17.25¢; 400 lb to 1 ton 17.75¢; under 400 lb 18.25¢.

Copper Anodes: In 500-lb lots, fob shipping point, freight allowed, cast oval over 15 in., 25.125¢; curved, 20.375¢; round oval straight, 19.375¢; electro-deposited, 18.875¢.

Copper Carbonate: 52-54% metallic Cu, 250 lb barrels 20.50¢.

Copper Cyanide: 70-71% Cu, 100-lb kegs or bbls 34.00¢, fob, Niagara Falls.

Sodium Cyanide: 96%, 200-lb drums 15.00¢; 10,000-lb lots 13.00¢ fob Niagara Falls.

Nickel Anodes: 500-2999 lb lots; cast and rolled carbonized 47.00¢; rolled depolarized 48.00¢.

Nickel Chloride: 100-lb kegs or 275-lb bbls 18.00¢ lb, del.

Tin Anodes: 1000 lb and over 58.50¢ del.; 500-999 59.00¢; 200-499 59.50¢; 100-199 61.00¢.

Tin Crystals: 400 lb bbls 39.00¢ fob Gra. sell, N. J.; 100-lb kegs 39.50¢.

Sodium Stannate: 100 or 300-lb drums 36.50¢ del.; ton lots 35.50¢.

Zinc Cyanide: 100-lb kegs or bbls 33.00¢ fob Niagara Falls.

Scrap Metals

Brass Mill Allowances: Prices for less than 15,000 lb fob shipping point. Add ¼¢ for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	12.000	12.000	11.25
Yellow brass	9.875	9.625	9.12
Commercial bronze			
95%	11.250	11.000	10.50
90%	11.125	10.875	10.37
Red brass			
85%	10.875	10.625	10.12
80%	10.875	10.625	10.12
Best quality (71-79%)	10.500	10.250	9.75
Muntz metal	9.250	9.000	8.50
Nickel silver, 5%	10.500	10.250	9.75
Phos. br., A, B, 5%	12.750	12.500	11.50
Naval brass	9.500	9.250	8.75
Manganese bronze	9.500	9.250	8.75

Other than Brass Mill Scrap: Prices apply to material not meeting brass mill specification and are fob shipping point; add ¼¢ for shipment of 60,000 lb of one group and ¼¢ for 20,000 lb of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper and copper borings 11.50¢; No. 2 copper wire and mixed heavy copper, copper tuyeres 10.50¢.

(Group 2) Soft red brass and borings, aluminum bronze 10.75¢; copper-nickel solids and borings 11.00¢; lined car boxes, cocks and faucets 9.50¢; bell metal 17.25¢; babbit-lined brass bushings 14.75¢.

(Group 3) Admiralty condenser tubes, brass pipe 8.75¢; muntz metal condenser tubes 8.25¢; old rolled brass 8.25¢; manganese bronze solids; (lead 0%-0.40%) 8.00¢; (lead 0.41%-1%) 7.00¢; manganese bronze borings, 7.25¢.

Aluminum Scrap: Price fob point of shipment truckloads of 5000 pounds or over: Segregate solids, 2s, 3s, 5c lb, 11, 14, etc., 3 to 3.50¢ lb. All other high grade alloys 5c lb. Segregate borings and turnings, wrought alloys, 2, 2.50 lb. Other high-grade alloys 3.50¢, 4.00¢ lb. Mixed plant scrap, all solids, 2, 2.50¢ lb borings and turnings one cent less than segregated.

Lead Scrap: Prices fob point of shipment. Fob soft and hard lead, including cable lead, deduct 0.75¢ from basing point prices for refined metal.

Zinc Scrap: New clippings 7.25¢, old zinc 5.75¢ fob point of shipment, add ¼¢ for 10,000 lb or more. New die cast scrap 4.95¢, radiator grilles 4.95¢, add ¼¢ for 20,000 lb or more. Unsweated zinc dross, die cast slab 5.80¢, any quantity.

Nickel, Monel Scrap: Prices fob point of shipment; add ¼¢ for 2000 lb or more of nickel or cupro-nickel shipped at one time and 20.00 lb or more of monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ¼¢ copper 23.00¢; 90-98% nickel, 23.00¢ per lb nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00¢ per lb contained nickel plus 8.00¢ per lb contained copper; less than 90% combined nickel and copper 26.00¢ per lb contained nickel only.

Monel: No. 1 castings, turnings 15.00¢; new clipping 20.00¢; solder sheet 18.00¢.

Sheets, Strip . . .

Some sellers plan to open first quarter books soon; output at peak for year with backlogs heavy

Sheet & Strip Prices, Page 156

New York — Some leading sheet sellers believe they may be in position to open books for first quarter by around Sept. 15. By that time they believe they will know about where they stand on rated tonnage for fourth quarter and also on certain special directive tonnage now actively contemplated, notably 40,000 tons of 16-gage cold-rolled sheets for manufacture of caskets for service men who died abroad. This casket tonnage may be allocated at any time, possibly under an AAA directive. Precisely what deliveries will be requested has not yet been made clear.

While sheet sellers in this district have been advised by their customers of various applications the latter have made for C ratings in fourth quarter, relatively low rated specifications have been received by sellers to date. There have been none, however, including one inquiry for several hundred tons of galvanized, which was received by a seller from a consumer who was not a regular customer, in fact, the buyer claims he had never sold the consumer a pound of steel. The matter is understood to have been put up to Washington for final decision.

The attitude of sellers generally, and in this they appear to find support in the wording of the CPA regulation governing the matter, is they will accept rated tonnage only from regular customers. They may be called upon by ratings to supply more in fourth quarter in they have scheduled for a number of their customers and if they are they will likely arrange to handle this additional tonnage and cutback on nonrated schedules accordingly, but their position generally is that they will not accept rated tonnage from other than regular trade, less under special pressure from Washington.

By having pared down quotas of new tonnage for the current quarter as compared with the preceding period, some producers, selling on a quarterly quota basis, believe that by the end of this quarter their arrearages will not be heavy. However, it is still too early for them to make an accurate estimate, and this also is a factor in their present delay in opening books for next year.

Pittsburgh—Mills do not know where to stand on steel to meet rated orders directives through rest of this year and before are at a loss in telling customers not coming within the scope of the deferred tonnage programs, when orders now scheduled for fourth quarter will be shipped. This situation has resulted in further confusing the production outlook among many metalworking companies. Automobile production, for example, probably will be adversely affected next quarter, due to rated tonnage which must get out or other programs. The galvanized sheet production is expected next quarter for other than rated orders. Demand for drum sheets for domestic requirements is expected to expand supply through first quarter. Further increase in the sheet and strip ca-

capacity is indicated in the proposed \$24 million expansion by Tennessee Coal, Iron & Railroad Co. at Birmingham. Mills are not encouraging placement of last quarter tonnage, although some interests have accepted forward orders without commitment as to delivery.

Cincinnati — Sheet production in this district is at the peak for 1946 so far, mill interests aiming to hold the carry-over into next quarter to a minimum. Fourth quarter outlook for sheets continues clouded by inability to estimate tonnage to be taken on directives. Even without intrusion of such tonnage, allotments would be considerably under needs. Most severe pinch is in cold-rolled and electrical sheets.

Birmingham — Sheet production is at virtual capacity but demand keeps well ahead. The scrap situation, under control by the largest producer, stands as a potential threat to production. The need for flat-rolled sheets for processing is exceptionally large as is that of roofing. Mills are producing some strip, most of in cotton ties.

Boston—Priority orders under CC ratings for fourth quarter delivery are coming through on cold-rolled strip in volume, notably for hinges and other builders' hardware. This will displace an equal volume tentatively scheduled for consumers not qualifying for ratings, thus increasing carryovers into next year. Cold strip mills are not getting the volume of hot-rolled material expected, notably in the low-carbon range, 0.50 or less. Higher carbon grades in some cases have been moved from October to next year. In view of unbalanced supply and depleted inventories rerollers are unable to schedule ahead, thus production and deliveries are erratic. The typewriter and office machine industry is hard pressed for narrow cold strip. Rated orders for sheets will cut shipments to many consumers next quarter and unless applied to warehouses, distributors are also likely to get less tonnage. Producers are filled with tempered strip orders in high-carbon ranges.

Chicago — The sheet situation grows tighter for fourth quarter with return of priorities, and one producer already has been obliged to reduce customers' quotas for this period by 25 per cent. Heavy carryover at yearend is certain, but can not yet be appraised. Books have not yet been opened for 1947, but some action in this direction may be taken in September. Consumers are most apprehensive over the future, lest there will be other encroachments on supply of sheets which will further decrease the quotas to them. The railroad have appealed to mills for assistance in obtaining modest quantities of galvanized sheets to repair box cars which must be kept in grain hauling service. The government's ordering 250,000 caskets for return of war dead, involving 50,000 tons of 16 and 18-gage sheets for delivery through 1947, is further upsetting the sheet picture.

Tin Plate . . .

Tin Plate Prices, Page 157

Pittsburgh — A revision in Direction 9 to M-21 for fourth quarter is momentarily expected, which would reduce the tonnage of tin plate for containers for perishable foods, pharmaceuticals and related items to 70 per cent of monthly production. Easing in this regulation

will make available more tin plate for B and C items. Seasonal food can requirements will diminish through the fall, and it also is pointed out that many can plants have undergone severe hardships in attempting to maintain output on their share of 15 per cent of tin mill products available for general distribution. There is little prospect that any conservation measures in the use of tin plate will be relaxed this year, because of the indicated continued shortage of pig tin.

Easing in car supply was just in time to prevent can manufacturers from tapering production, which would have seriously affected perishable food packing activity during this peak seasonal period.

Expansion in tin plate production facilities now under way is expected to be adequate to meet indicated increase of 20 per cent in can manufacturing over the next five years to about 20.5 billion units a year, in contrast to 17 billion prior to the war.

Chicago—Box car shortages continue to interfere with normal shipments of tin plate and from the situation is expected to grow more aggravated rather than improve. The critical point is likely to come in October and November. The delay in shipments comes when stocks of tin plate in hands of canmakers are said to be the lowest in many years.

Steel Bars . . .

First quarter books may be opened soon when certified tonnage is more definite; backlogs still heavy

Bar Prices, Page 156

New York — Most bar sellers, it is believed, will open books for next year before the month is over. They expect shortly to be able to gage rather accurately as to what they may have in the way of carryovers at the end of this year and, therefore, what they may be able to promise for shipment in the early months of next year. Practically all producers are still well behind on current commitments, especially on small sizes, and there appears little doubt they will have a substantial carryover at the end of this year. However, until they have a better idea as to what they may be called upon to supply in rated tonnage for fourth quarter they cannot draw their estimates closely.

At present producers are unable to accept new tonnage for this year, except alloy bars, which they can furnish in liberal supply, and possibly some few of the larger sizes of cold-drawn bars.

Pittsburgh—No appreciable rated tonnage or directives for fourth quarter have been placed with producers to date, and although volume of this tonnage is expected to be fairly substantial, sellers are unable to determine specific delivery promises for consumers not coming within the scope of rated tonnage programs. Consumers, in turn, are unable definitely to fix production schedules for they have no assurance all tonnage on mill books now scheduled for fourth quarter rollings will be shipped. Mill carryover tonnage into fourth quarter is expected to represent about two months' output on an average, and is expected to include a relatively small amount of certified tonnage for September delivery.



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WELL WATER SYSTEMS VERTICAL TURBINE PUMPS

Most producers are discouraging ordering for first quarter, and are not scheduling any tonnage for that period until order backlogs are clarified in respect to volume of rated tonnage to be expected and likely amount of fourth quarter carryover.

Philadelphia — Small hot-rolled carbon bars, 1½-inches and under, appear about as scarce as anything in the whole steel category. Most mills are behind three to four months on current commitments, with order books crowded over the remainder of the year. On larger sizes producers are covered for 1946 but are not far behind on promises. Alloy bars are in free supply for fourth quarter.

Steel Plates . . .

Some producers are taking selected tonnages for 1947; export and ship repair orders being placed

Plate Prices, Page 157

Pittsburgh — Mills report nearly two months carryover tonnage due to steel and coal strikes, which accounts for fact fabricators have not been able to make much headway against near record backlogs in recent months. Until nearly depleted fabricators' inventories can be augmented somewhat, miscellaneous tank, railroad car and barge construction will remain well behind schedule. However, increased output of plates at U. S. Steel's Geneva plant, scheduled for September, should ease the corporation's extended delivery commitments with eastern customers somewhat. One large interest reports September production schedules must be rejuggled again as result of an export directive for about 9000 tons. Mill deliveries generally are extended into December.

New York — Although some plate producers continue to enter tonnage for next year, they are doing so on a highly selective basis, and some are not accepting any tonnage. In general, they are concentrating principally on catching up on arrearages, and without much success in most cases, with output limited by shortage of pig iron and scrap. Some producers are at least three months behind on current commitments and one is behind almost four months.

September schedules have been set up to roll a limited tonnage of plates for export under the directive allocations announced a few weeks ago. So far nothing has been done with respect to export allocations of plates and other steel products generally for the closing month; however, it is believed there will be allocations for each month over the remainder of the year and that October allotments will be announced shortly.

The Maritime Commission has placed contracts with two yards in this district for the reconversion of two troop transport ships for passenger cargo service, one ship for each yard. Two other such contracts also have been placed, one with a Baltimore yard and the other with a shipbuilder in New Orleans.

Philadelphia — Plate production is being fairly sustained at the reduced rate prevailing over recent weeks, because of shortage of pig iron and scrap. Mills still have nothing to offer for this year, al-

though some are accepting limited order for first quarter of next year. All still well behind on current commitments. American Locomotive Co., New York, will supply 700 tons of 48-in steel pipe for the city of Philadelphia award being made through Frank Curtis, Philadelphia, general contract.

Birmingham — Pressure for plates eased little and deliveries for the most part are several months delayed, with large backlogs into the new year a certainty. A general overall improvement, however, in output of plates is expected to have a wholesome effect on the situation by the end of the year, at latest.

Seattle — Plate demand continues strong, tank jobs requiring most, but shops are handicapped by lack of material. Steel pipe contracts awarded months ago are still incomplete because plates have not been available. Northwest Marine Iron Works, Portland, Ore is low at \$472,500 for a stern wheel steel tug for the port of Portland, requiring about 200 tons of plates. Bureau of Reclamation, Denver, will receive bids Sept. 10 for three 24-inch welded steel pipe connections and accessories for the Buffalo Rapids project in Montana.

Wire . . .

Wire Prices, Page 157

Boston — Pressure on wire mills is increasing and inventories of more consumers are near exhaustion. Many are seeking to place orders for next year some through 1947, but relatively little tonnage is being accepted on a firm basis. The automobile industry is asking for more wire for fourth quarter, including valve spring stock, and more suppliers to the industry who use wire are pressing for deliveries. Settlement of strikes in some cases revives demand. Mechanical spring requirements are all up. There is dearth of low-carbon material and users in some instances have changed specifications to higher grades in order to get supply. Shortage of upholstery wire in 11.5 gage is critical. Rod supply shows no improvement as allotments have been further reduced. Producers are drawing more finished wire and have less for nonintegrated mills. Inventories of screw stock are small as general rule.

Birmingham — Even with virtual capacity production, wire is not sufficient to meet current needs. Added to the acute scarcity of nails is a growing lack of wire fencing, barbed wire and drawn wire for miscellaneous use. Jobbers in the immediate Birmingham district report virtually no stocks of merchant products.

Chicago — Most consumers of wire and wire products are disappointed over tonnages allocated to them. Among the are the automotive and bedding industries. Demand is extremely heavy for both high and low carbon grades, and the situation is particularly tight for diameters of 1/4-inch and smaller. Output of electrical wire and cable is restricted by copper shortage and customers are impatient over deliveries, being unable to fill old orders. All merchant products continue in tight demand with nails, bale ties and tacks topping the list. Rumors of black market operations in nails persist, these including trading of nails for other tight construction items such as lumber.

Structural Shapes . . .

Structural Shape Prices, Page 157

Boston — Restrictions on nonhousing construction are resulting in less inquiry, situation expected to grow over the next few months. Fabricators have fair logs in small tonnage lots in this area, while larger shops are well filled with work for months. Plain material shipments are slightly heavier but deliveries on new inquiries are into second quarter on most smaller sizes. No bids were received for the 850-ton bridge at Nantuxet Harbor, N. H. Other bridge and highway work is being held up or delayed. An addition to the plant of the Pullman-Standard Car Mfg. Co. at Worcester, Mass., requires 100 tons.

New York — Included in the larger structural awards in this district recently were 4600 tons for a section of the west elevated highway, placed through by Cox Construction Co. Inc., with Inland Structural Steel Co., New York. Delivery action is also expected on approximately 5000 tons for the Lincoln housing project for the New York Housing Authority. New inquiry, hampered by business restrictions on non-housing construction, is light.

Seattle — Structural fabricating shops are making the best of a bad situation with steel allocations and deliveries far below current requirement. Inventories are extremely low and fabricators are anxious in making delivery guarantees in view of uncertain conditions.

Chicago — Because of the bad delivery situation, most structural fabricators in this district are trying to avoid taking new business. Backlogs are increasing and mill shipments of material are falling behind quotas, indicating that jobs booked earlier will suffer. In some instances, fabricators have been offered contracts with the mill furnishing the steel, but this is not working out well. One structural mill in the district is preparing to reduce quotas to customers 25 per cent in the next quarter, this because of impact of the reimposition of priorities and heavy carryovers.

Philadelphia — CPA restrictions on nonhousing construction continue to result in much work in abeyance. During the period from Aug. 16 to Aug. 22, inclusive, the district CPA office, while reviewing 24 projects valued at \$680,000, rejected 40 projects valued at \$1,280,000. A few moderate-sized tonnages are being placed, with most fabricators well ahead and having considerable difficulty obtaining adequate tonnage from shape mills.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 157

Chicago — The past week has been one of the quietest in many months as to awards and inquiries for reinforcing steel. Production is far below requirements, and many construction jobs go begging. In one instance, a contractor is receiving only one-third of his quota, and has no idea how it will be able to satisfy the orders standing. Books orders placed before the situation worsened. The government's action to cut back commercial construction approximately one-fourth to assist the veterans housing program will

relieve some pressure, but not enough.

Seattle — Mills have backlogs reaching to the end of the year and are not booking business except in small tonnages for regular customers. Books for 1947 will not be opened until fourth quarter. Reinforcing bar business pending includes more than 100 tons for Washington state bridges, bids Sept. 4, about 100 tons for a warehouse at Vancouver, Wash., and an unstated tonnage for a cannery plant at Portland, Oreg. Much potential business awaits placement.

Philadelphia — The leading Pittsburgh producer of reinforcing bars has advised distributors in the Philadelphia district that he will no longer service them after the end of this year. It is understood the

same word has gone out to jobbers in Baltimore and Washington. While there has been no official explanation it is assumed in the trade that the action was prompted in large measure by the freight rate absorption necessary in shipping this low-profit item into these districts. This leaves the servicing largely up to one eastern producer.

Rails, Cars . . .

Track Material Prices, Page 157

New York — A leading car order involves 1000 freight cars for the Nashville, Chattanooga & St. Louis, placed with the Pullman-Standard Car Mfg.

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Co.'s plant at Bessemer, Ala. While bookings probably were not as heavy in August as in July, when more than 15,000 freight cars were placed by domestic lines, a substantial total will undoubtedly be reported. Meanwhile, September is starting with some sizable lists on inquiry.

Recent locomotive buying is featured by twenty-three 1500-horsepower diesel electric freight engines placed with American Locomotive Co., New York, by Gulf, Mobile & Ohio; 22 similar units have recently been delivered by this builder to this road.

Philadelphia — The Pennsylvania Railroad will start early next year on construction in its own shops of 1100 box cars. Except for underframes and trucks these will require about 12,000 tons of steel, with some protection against this tonnage already received.

Pittsburgh — To break the bottleneck in freight car construction, CPA is considering issuing directives to speed flow of scarce materials needed for the repair of 80,000 freight cars and construction of 40,000 new ones this year. Official figures as to the amount of steel needed for this program are not available, although it is estimated that around 300,000 tons of steel will be required for repair purposes and about 700,000 for construction of new ones. Steel items involved would include plates bars, sheets, wheels and axles. The 36,750 cars ordered by France are the chief bottleneck in preventing freight car builders to increase output of domestic cars.

Effective midnight Aug. 31, Carnegie-Illinois Steel Corp. will increase the price of one-wear freight car wheels \$3.70

per wheel. On Type A-33 (as incorporated in the new designs effective Aug. 1) for 50-ton cars or less, the new price will be \$27.50; price for Type B-33 for 70-ton cars will be \$29.50.

Pig Iron . . .

Supply improves slightly but scrap shortage limits foundry melt; inventories reduced to minimum

Pig Iron Prices, Page 159

Philadelphia—In contrast to certain other areas on the eastern seaboard, the Philadelphia district reports an increase in foundry melt for August. This is ascribed to the fact there is more certified production in the Philadelphia area, especially in pressure and soil pipe and sanitary ware required for the national housing program. September is expected to be about on a parity, if not more active, as pig iron supply may be slightly heavier, with possibly some betterment in flow of scrap, although this is problematical.

A complicating factor is increasing scarcity of coke. Some leading producers of by-product coke are setting up allocations based on 1945 shipments and this obviously will not be enough in many cases as foundries generally have more work on their books than a year ago and a number, further, will be squeezed by diversion of coke to foundries engaged in preference work. Coke sellers, it is thought, will see that the latter com-

panies receive an adequate supply, tributing to the shortage is heavier put of foundry iron, which requires fuel in its production than basic. One district furnace, after spending last two weeks of August on basic, is on foundry iron.

New York — District foundry in August was down from the previous month, according to present indications. Pig iron shipments were up slightly most consumers did not have ever inventory to draw upon that they in July, and, moreover, were unable to obtain as much scrap as in July. A complicating factor last month was increasing scarcity of coke, especially the last two weeks. Some trade leaders doubt if September melt will show improvement; others, though, believe there will soon be a breaking of the deadlock on scrap, which should stimulate flow of that material somewhat that production of pig iron will stabilize.

Some trade leaders estimate that iron production in August amounted about 4,800,000 tons for the country as a whole, which would compare 4,650,042 tons in July, as currently reported by the American Iron and Steel Institute.

Pittsburgh—Foundry interests do expect improvement in pig iron supply through the rest of this quarter, means many will have to sharply cut operations and in a few instances their plants, as they are drawing down inventories. The merchant here reports certified tonnage options have been increased for September due to receipt of late applications, not known yet to what extent the tonnage requirement will absorb the quarter pig iron production although there is some prospect that overall usage may be reduced because of hardship imposed on those four serving automotive and other important industries not coming within the scope of CPA's certified tonnage program. These interests are seeking a limit on tonnage shipped under this program presently nearly 50 per cent of the 35 tons of merchant pig iron channel foundries monthly is being certified. Necessity of the Kaiser-Frazer Co. lease for three years the high Anna furnace of Siruthers Iron & Co., Youngstown, is indicative of overall critical pig iron shortage. Furnace has been idle since last year. Supplies of coke, iron ore and lime have been made available with operations already are under way. Operating arrangement do not include a government subsidy.

Boston—As most larger consumers not qualify for certified tonnage this is notably affected by growing shortage of iron. Melt continues to decline most gray iron shops, but holds relatively well in malleable foundries. Some of the latter have certified orders. Works depend on week to week deliveries, which are hammered from the by railroad car supply. Prospects for resumption by Mystic blast furnace not bright.

Buffalo — Although merchant producers report current recording output is being spread in an attempt to satisfy customers, complaints continue to accumulate from melters claim that operations are being curtailed, or checked by insufficient supply. Sellers admit frankly that current the

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capacity operations fail to cone with eased demands from foundries. In obtaining brisk operations, producers confronted by a constant coke supply problem. A producer who is operating his furnaces reports that one unit kept going with coke allocated from the other one of the same company's furnaces located elsewhere which is down for relining. Certified tonnage continues to run close to sellers' already planned very schedules.

Chicago — Foundries have given up for the present of obtaining increased supplies of raw materials, principally pig iron, coke and scrap. Allocations of iron are under tight control, but tonnage is far under that needed to maintain operations at a high level. City assistance to those shops making repairs needed in the veterans housing program serves only to restrict operations. Other shops unable to get preferential treatment, because overall iron supply remains fairly constant. In this district, of 41 blast furnace continue to operate, bulk of output is basic iron for making.

Cincinnati — Foundries in this district have been pressed for pig iron, scarcity of supplies acting as a curb on the melt. However, shipments for August were better than some feared when CPA dividers took such a large part of southern. Furnace representatives were regarding the outlook for September.

Birmingham — The pig iron situation remains as unsatisfactory as ever. Bearing earlier expectations, merchants estimate that shipments to foundries are hardly 50 per cent of regular rates. A considerable portion of the city's output is still being moved without certification.

Scrap . . .
Shortage still acute with tonnage held back until price deadlock is broken; inventories are low.

Scrap Prices, Page 160

Ton — Movement of all grades of scrap to consumers is light as the matter tends to stalemate yard tonnage until the question of any possible price is clarified. In some instances supplies are heavier than in weeks past, but draw on already dangerously low levels. Bids by dealers for prepared scrap melting steel, Boston Navy Yard quotations to Nov. 1, were well over \$16.37 for No. 1, while unprepared brought a bid of \$14.35. Since the ruling forbids dealers paying over for prepared scrap, new tenders are taken. However, this figure was before the ruling, which became effective Aug. 26. Ceiling for No. 1 pre-heavy melting steel is \$15.05.

Burgh — Scrap shipments have shown no improvement and are not expected until the price question is presently settled. Industry members with OPA officials in New York last week pointed out their reasons for a price of \$3.50 per ton increase. In the discussion at this meeting the matter of increasing the dealers' price for handling unprepared material

from \$3.50 to \$5 per ton to offset higher labor costs, increased freight rates on shipments to yards from producing points and necessity to rely more and more on remote areas for collection of badly needed scrap. Steel ingot has declined slightly the past two weeks, but is still close to capacity. Mills are drawing heavily on inventories, which are somewhat larger than in other districts. Considerable scrap is going direct to mills from fabricators, with large shipments from automotive plants cited. Reports continue of upgrading scrap, with No. 2 heavy melting selling as low phosphorus, etc. Alloy contamination and high handling charges are chief deterrents restricting increased movement of battlefield scrap to this country. One large interest is said to have accumulated a large tonnage of this type of scrap, but to date has been unable to effectively utilize it because of high alloy content.

Buffalo — With the short scrap supply becoming more desperate, increased pressure is reported for reciprocal deals between consumers and supply sources, bypassing the dealer. Pig iron also was reported moving to a buyer in return for blast furnace scrap. Dealers find railroad lists are not averaging more than 25 per cent of normal. The poor tonnage on industrial lists is attributed to delays in full motor output, but one leading dealer reports efforts to establish reciprocal deals are rejected. Dealers continue to await higher OPA ceilings, but deny allegations that large amounts of scrap are being held back pending the price action. Breaking the unusual lull in water receipts for this time of the

year, a boatload of 2200 tons of cast scrap has arrived from Michigan.

Cincinnati — Nothing has developed in this district to alleviate anxiety about scarcity of iron and steel scrap. Mills are either depending on current shipments, because of exhausted reserves, or digging more deeply into stockpiles. The foundry melt is being curtailed by the double shortage of scrap and pig iron. Brokers and dealers are under constant pressure for deliveries to consumers.

Birmingham — While scrap scarcity has not thus far forced actual closing of any furnaces, that move is considered inevitable in the long run. Considerable trading between soil pipe people and those with scrap is reported and that, to an extent, further demoralizes the situation.

Seattle — Scrap shows no improvement and receipts continue less than consumption. No more shipyard material is available and country shippers are holding back because they claim ceiling prices give too narrow a margin in view of labor scarcity and high wages.

New York — There is likely to be a shortage of scrap for some time, but probably not as pronounced as it has been. Meanwhile, pending word as to the expected advance in ceiling on prepared grades scrap shipments are being held up at many points, in some cases with material already on cars. Aware of this situation and not disposed to retroactive action while the study is being made OPA is centering immediate attention on establishment of higher prices.

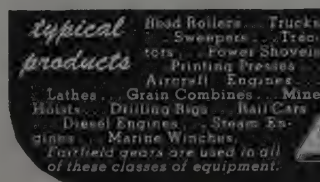
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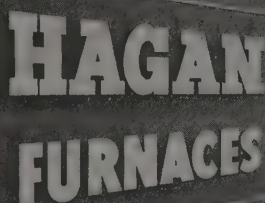
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to reduce bartering, upgrading and other measures taken over recent weeks as the scrap shortage increased, to circumvent ceilings. Higher prices are expected to give impetus to scrap movement, which in some areas has dropped 50 per cent in recent weeks, in hope of higher prices.

Chicago — Short supplies of scrap serve as a constant threat to steelmaking operations. During the past week receipts came close to consumption, but when deficiencies occur inventories are dipped into. So long as shipments continue to match melting requirements maximum output can be maintained, but fear is that stocks may become exhausted and with this cushion, small as it is, gone, shrinkage of intake will interfere with operations. Feeling is growing that favorable action by OPA on a price increase will stimulate the production of scrap. Fact that flow has held its own the past week or two is attributed to a higher production of scrap by manufacturing industries rather than more activity in searching out country scrap. Volume of the latter is almost negligible.

Warehouse . . .

Warehouse Prices, Page 158

Pittsburgh — Some increase in overall mill warehouse shipments occurred this month, but the improvement has not been uniform between warehouses or as to specific steel products. Warehouse steel stocks continue nearly depleted in light gage sheets and galvanized items, small angles, wide flange beams and channels. Many warehouse customers continue to operate well below capacity, due to critical shortage of many steel items and in spite of fact they frequently accept substitute specifications. Although distributors have no preferred status under CPA's fourth quarter rated tonnage program, most warehouse interests believe some form of a mill warehouse load directive will be necessary to meet minimum essential needs of customers. Under present set-up it is believed doubtful mills can maintain present volume of warehouse steel shipments in light of anticipated heavy volume of rated tonnage for fourth quarter.

Seattle — Jobbers are in receipts of steady demand for all classes of steel, with nails, galvanized sheets and some other materials in short supply and in some cases unavailable. Prices are unchanged.

Cincinnati — Some improvement in mill shipments enabled warehouses to lift sales volume in August. Customer pressure continues unabated on small bars, structurals and sheets but replacement of these items is so laggard that inventories are almost continuously exhausted.

Philadelphia — Some leading Philadelphia jobbers report that incoming and outgoing tonnage in August was heaviest so far this year. Also they look for a good month in September. They are less certain, however, as to prospects in fourth quarter, with Direction 12 expiring Sept. 30. Under this order mill tonnage is being received in the current quarter and is working out satisfactorily, according to most jobbers. Scarcity of small bars and angles and in most grades of sheets prevails, because of unusually heavy demand.

Chicago — Each passing week finds warehouses losing ground in their inventory position. Receipts fall short of

sales, reducing stocks of some products, particularly flat-rolled, to near exhaustion levels. Some distributors who depend upon eastern mills for bulk of the material have suffered cuts in quotas. Outlook for balance of the year is definitely discouraging.

Nonferrous Metals . . .

Nonferrous Prices, Page 162

New York — Ceiling price increase 1/4-cent per pound on four grades of brass and bronze ingot to cover high scrap costs has been granted. These are the red and yellow brass and bronze groups 88-10-2 and 80-10-10. Supply of major nonferrous metals are tight and basic industries using them are confronted by continued shortages, including automotive, housing and electrical. Foreign copper has sold abroad equivalent to 16.75 cents less Atlantic ports, with demand active, compared with 15¢ here. Northern Rhodesian production has been resumed after strikes. Stock of copper here has been reduced 264,849 tons as of Aug. 1, a decline from 323,101 tons the previous month. Consumption in July was 96,743 tons compared with 91,586 tons in June. Considering the stoppages the average of 87,815 tons consumed monthly thus far this year is good. For seven months consumption was 614,709 tons.

Limited tonnage of high grade zinc has been authorized for release to consumers. This action follows the practical withdrawal of some producers from market because of prices. Zinc stock approximates 202,685 tons, 141,866 tons being regular high grade. Monthly output has been 31,416 tons below estimated monthly consumption of 72,000 tons. Price currently is the confusing factor in zinc, both in production and distribution. Release of regular high grade zinc to help brass producers but not galvanize.

Higher prices for foreign concentrates is affecting offerings here. September zinc releases will approximate 40,000 tons, including 20,000 tons of foreign Reserve metal. Here, again, process affecting offerings and lead production from concentrates and scrap obtained July on the 9.50-cent basis is not available.

Stockpile of tin is heavier, 58,000 tons Aug. 1, compared with 54,852 tons the previous month. Of this, 27,000 tons was in pig tin and the remainder in concentrates.

Semifinished Steel . . .

Semifinished Prices, Page 156

Pittsburgh — Deliveries are extended into March next year on export tonnage and these commitments would be greater if mills were to book all inquiries. Most producers do not have sufficient billet mill capacity to operate mills at desired pace. Critical shortage of wire rods continues to restrict output of nonintegrated wire producers although supply has improved somewhat recently for interests in New England area. Tight supply situation in sheet bars should be eased considerably as result of the government's subsidy program under which 205,000 tons scheduled to be produced by Sheet Steel Corp. and Jones & Laughlin Steel Corp. for four nonintegrated sheet mills.

Beehive Oven Coke Prices at Foundry Level Revised

Coke Prices, Page 157

Pittsburgh — Increased prices of \$1.25 and \$1.35 a ton on Connellsville district machine and hand-drawn beehive furnace coke, respectively, announced recently by OPA, also are applicable on foundry coke in that area as well as on both classifications in New River and Wise county districts.

The market on machine-drawn beehive foundry coke in Connellsville district is now \$9.75 to \$10 per net ton; New River county, \$10.25 to \$10.50; Wise county, \$9 to \$9.50. Beehive furnace coke in Wise county is quoted at \$8.50 to \$9 per net ton.

The price increases are retroactive to May 17 on those contracts which were made on adjustable pricing basis as permitted under order 18 issued by OPA May 17 in accordance with section 3 of PR-77.

Coke production continues at near capacity pace although freight car shortage is retarding coal output, as much as 50 per cent at some mines, which will not adversely affect coking operations unless remedied. Coke stocks at foundries and steel plants are well below normal but adequate to meet current needs if incoming receipts are maintained. Chief concern at the moment is the critical pig iron shortage.

High-production cost producers who are unable to recover total costs at the new level are permitted to apply for individual adjustments if they can qualify under the beehive oven coke regulations.

At the same time OPA provided that sellers may establish their ceiling prices on the basis of their average current costs of acquisition plus the average percentage discount or mark-up in effect March 31, 1946. However, this applies only to beehive oven coke other than furnace coke produced in the Connellsville district and other than foundry coke produced in Fayette and Nicholas counties, W. Va. Distributors of such coke have been excluded because the minimum prices on March 31 did not provide for any margin for their sales. Dollar-and-cent ceiling prices were fixed for all sellers so that distributors could buy and resell only because of the concessions granted by their suppliers.

Bobbi Car Company To Move Operations to Birmingham

Bobbi Motor Car Corp., San Diego, Calif., manufacturer of small automobiles, has taken a five-year lease on 700,000 sq. ft. of space at the former Bechtel-McCone Corp. plant at Birmingham to which Bobbi will move its entire operations.

When in full production the plant is expected to employ between 10,000 and 20,000 workers and to manufacture 200,000 cars annually. Moving of machinery to Birmingham is to be started immediately and it is expected that floor samples of the car will be ready within three or

four months. The car is to retail at about \$700. A world-wide dealer organization has been set up and millions of dollars worth of orders are available, according to S. A. Williams, president of the Bobbi company.

The two score industries now located in the former Bechtel-McCone plant will not be affected, some of them being in position to manufacture components for the Bobbi car.

Union Pacific Prepares For Heavy Geneva Traffic

Union Pacific Railroad's president, George F. Ashby, on a visit to Salt Lake City recently disclosed preparations of the road to serve an increased rate of operations at the Geneva steel mill in Utah.

Union Pacific, reported Mr. Ashby, will purchase 100 open-top all-steel gondolas, costing \$5 million, and will use them to haul raw materials to the Geneva plant and to carry finished products away.

Mr. Ashby also said the railroad is encouraging private development of trona (soda ash) deposits in Wyoming with the idea that this development could be integrated with Utah's steel industry. He forecast that the trona development is potentially the forerunner of an important chemical industry in western Wyoming.

8½-Mile Tunnel Considered For Cascade Mountains

OLYMPIA, WASH.

Officials of Washington state are studying plans for a proposed 8½-mile tunnel through the Cascade mountains, the design having been submitted by C. P. Rollins, Seattle engineer. The cut would reduce distances from Puget Sound to eastern Washington by 10 to 20 miles.

The plans call for a two-lane vehicular bore paralleled by a 16-foot railroad tunnel. No estimate of the cost has been calculated.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

23,350 tons, sheet rolling mill, Bettendorf, Iowa, for Aluminum Company of America, to Bethlehem Steel Corp., Bethlehem, Pa.

4600 tons, section of west side elevated highway, New York, through P. T. Cox Construction Co. Inc., general contractor, to Harris Structural Steel Co., New York.

1800 tons, board plant, Johns-Manville Co., New York, for construction at Natchez, Miss., through Ford, Bacon & Davis, New York, to Ingalls Iron Works, Birmingham, Ala.

1700 tons, power plant, American Gas & Engineering Service Corp., Brilliant, O., to American Bridge Co., Pittsburgh.

1000 tons, brewery, National Brewing Co., Baltimore, through Consolidated Engineering Co., Baltimore, to an unstated fabricator.

580 tons, ten garages various locations in state of New York, to White Plains Iron Works, White Plains, N. Y.

500 tons, sheet piling, Cherry Creek dam, Denver, to Carnegie-Illinois Steel Corp.,

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THE AMERICAN CRAYON COMPANY
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NEW YORK SAN FRANCISCO DALLAS

Chicago; David Gordon Bldg. Co., Denver, contractor; bids June 18.

500 tons, du Pont chemical plant, Toledo, O., to Clinton Bridge Works, Clinton, Iowa.

425 tons, addition for Boston Woven Hose & Rubber Co., Cambridge, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; F. Leroy Fox Inc., Cambridge, general contractor.

415 tons, bumper plant addition, Saginaw, Mich., for General Motors Corp., to Whitehead & Kales Co., Detroit.

410 tons, soldiers' home, Chelsea, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; M. S. Kelliher Co., Boston, general contractor.

400 tons, New York Central bridge, Little Falls, N. Y., to American Bridge Co., Pittsburgh, through Walsh Construction Co., New York, general contractor.

400 tons, hangar, Atlanta, Ga., to Lehigh Structural Steel Co., Allentown, Pa.

310 tons, sheet piling, breakwater, Michigan City, Ind., for Northern Indiana Public Service Co., to Carnegie-Illinois Steel Corp., Chicago.

260 tons, warehouse, Radville Oil Co., Philadelphia, through Frank J. Larkin, that city, to Lehigh Structural Steel Co., Allentown, Pa.

250 tons, woodworking plant for York Corp., York, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

165 tons, addition for Pneumatic Scale Co., Norfolk Downs, Quincy, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; George A. Fuller Co., Boston, general contractor.

STRUCTURAL STEEL PENDING

2500 tons, research buildings, du Pont interests, New Bridge, Del.

900 tons, plant additions for Parish Pressed Steel Co. Division of Spicer Mfg. Co., Reading, Pa.

750 tons, station platform extensions, New York City Board of Transportation; bids Sept. 16.

400 tons, New York Central bridge, Little Falls, N. Y., Walsh Construction Co., New York, low on general contract.

308 tons, overpass, Clifton, N. J.; bids Sept. 17, Spencer Mill Jr., state highway commissioner, Trenton.

125 tons, state highway bridge, Carbon county, Pennsylvania.

100 tons, dairy plant for Cooklyn Milk Co., Philadelphia.

REINFORCING BARS ...

REINFORCING BARS PLACED

300 tons, addition, Chicago, for Regensteiner Corp., to Joseph T. Ryerson & Son Inc., Chicago.

REINFORCING BARS PENDING

650 tons, water filtration plant, Hammond, Ind., for city; Joseph J. Duffy Co., Chicago, low on bids Aug. 10; bids rejected, new bids to be asked.

300 tons, clay drying and rock crusher building, Dixon, Ill., for Medusa Portland Cement Co.; Hunken-Conkey Co., Cleveland, contractor.

100 tons, overpass, Clifton, N. J.; bids Sept. 17, Spencer Miller Jr., state highway commissioner, Trenton.

100 tons, warehouse, Vancouver, Wash.; contract to Heinrichs, Beedle & Hearne.

Unstated tonnage, plant for Starr Fruit Products Co., Portland, Oreg.; bids soon.

PIPE ...

CAST IRON PIPE PENDING

300 tons, various sizes, for Vancouver, Wash.; bids Aug. 28.

PLATES ...

PLATES PENDING

200 tons or more, steel tug for Port of Port-

land, Oreg.; Northwest Marine Iron Works, Portland, low at \$472,500.

Unstated tonnage, three 24-inch welded steel connections for Buffalo Rapids project, Montana; bids to Bureau of Reclamation, Denver, Sept. 10.

RAILS, CARS ...

LOCOMOTIVES PLACED

Gulf, Mobile & Ohio, twenty-three 1500-horsepower diesel-electric freight locomotives to American Locomotive Co., New York.

Kansas City Southern, one 8000-horsepower 4-unit diesel-electric freight engine, Fairbanks, Morse & Co., Chicago.

Kansas City Southern, 19 diesel-electric locomotives to locomotive division of General Motors Corp., La Grange, Ill.; includes twelve 1000-horsepower switch engines, five 6000-horsepower, 4-unit freight engines; and two 3000-horsepower, 2-unit passenger locomotives.

RAILROAD CARS PLACED

Atchison, Topeka & Santa Fe, 1000 all-steel box cars, to its own shops; 750 additional cars are yet to be placed.

Baltimore & Ohio, 1000 fifty-ton box cars, to Pressed Steel Car Co., Pittsburgh.

Nashville, Chattanooga & St. Louis, 1000 fifty-ton all-steel freight cars, to Pullman Standard Car Mfg. Co., Bessemer, Ala.; shops; includes 500 box cars, 200 gondolas and 300 hoppers.

Pennsylvania Railroad, 1100 box cars, to own shops for 1947 construction.

CONSTRUCTION AND ENTERPRISE

ALABAMA

MOBILE, ALA.—Tennessee Valley Authority, New Sprinkle Bldg., Knoxville, Tenn., plans a phosphate fertilizer plant, to cost about \$3 million.

CALIFORNIA

COMPTON, CALIF.—E. R. Parker, 135 East Palmer St., will build a machine shop 68 120 feet at 401 East Pine St., to cost about \$15,000.

LOS ANGELES—De La Mar Bed Spring Co., 1634 Nadeau St., has permit for a plant addition, to cost about \$8200.

SANTA CLARA, CALIF.—Blow-Knox Corp., Pittsburgh, has plans for a plant on 24-acre site north of here, for manufacture of food processing equipment and earth moving machinery, to cost about \$1 million.

SOUTH GATE, CALIF.—Pacific Cast Iron Pipe & Fittings Co. has building permit for a monorail superstructure at its plant at 9430 Rayo Ave., to cost about \$5000.

CONNECTICUT

SPRINGDALE, CONN.—Stamford Rolling Mills, Springdale, has plans for a steel and concrete plant addition, to cost about \$150,000.

GEORGIA

ALBANY, GA.—City has let contract to Stacey Dresser Engineering Co., Cleveland, division of Stacey Bros. Gas Construction Co., Cincinnati, for design and construction of propane-air gas plant, with capacity of 312,000 cubic feet per day, including unloading and storage facilities for liquid propane.

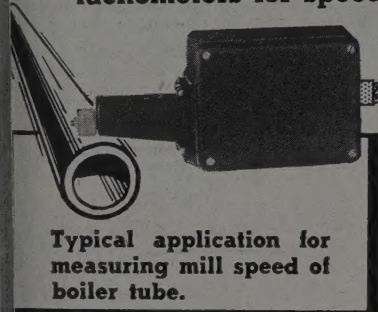
ILLINOIS

ALTON, ILL.—Illinois Power Co., 135 North Main St., Decatur, Ill., has plans for a generator plant with capacity of one billion k-

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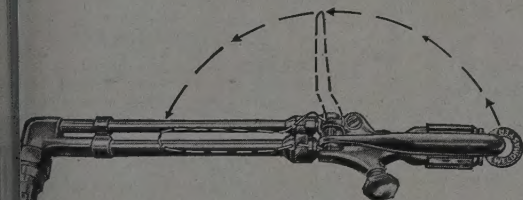
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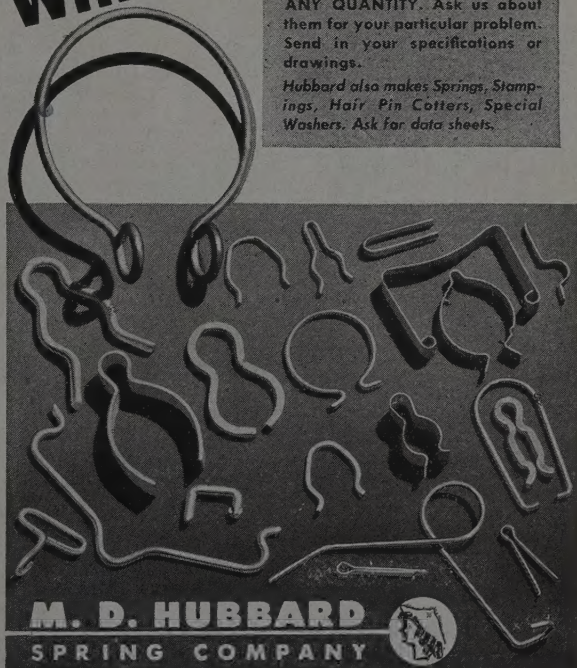
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hours per year to cost about \$17 million.

CALUMET CITY, ILL.—B. F. Goodrich Co., 333 West Lake St., Chicago, is having plans drawn for a one-story rubber reclamation plant.

CHICAGO—Leishern-Sobel Steel Co., 4914 South Wentworth Ave., plans a one-story 60 x 200-foot warehouse to cost about \$200,000. A. Epstein, 2001 West Pershing Rd., is architect.

SKOKIE, ILL.—Public Service Co. of Northern Illinois, 72 West Adams St., has let contract to W. E. Schweitzer Co., 2207 Dodge Ave., Evanston, Ill., for a gas plant addition, to cost about \$185,000.

WINCHESTER, ILL.—Illinois Rural Electric Co., S. R. Faris, manager, plans a generating plant addition and a 1050 kva unit, general contract to Busch-Sulzer Bros. Diesel Engine Co., 3300 South Second St., St. Louis, to cost about \$175,000. Stanley Engineering Co., Muscatine, Iowa, is engineer.

INDIANA

FORT WAYNE, IND.—Indiana Service Corp., 2101 Spy Run St., C. V. Sorenson, president, plans a 45,000 kva substation and high-tension lines, to cost about \$1 million.

INDIANAPOLIS—Radio Corp. of America, Cooper and Front Sts., Camden, N. J., plans a one-story 36 x 452-foot plant addition costing over \$200,000. F. W. Daniels, 1650 Hanna Bldg., Cleveland, is consulting engineer.

INDIANAPOLIS—Public Service Co. of Indiana, Traction Terminal Bldg., R. A. Gallagher, president, plans a power plant addition at Edwardsport, Ind., including 37,500 kw generator, to cost about \$5 million, and a steam generating plant at Terre Haute, Ind., with capacity of 300,000 pounds hourly, to cost about \$1,500,000. Sargent & Lundy, 140 South Dearborn St., Chicago, are consulting engineers.

IOWA

OTTUMWA, IOWA—Iowa Southern Utilities Co., E. Schutts, Centerville, Iowa, in charge, plans a power station costing about \$1 million. Federal Engineering Co., 505 Putnam Bldg., Davenport, Iowa, is consulting engineer.

MASSACHUSETTS

PITTSFIELD, MASS.—General Electric Co., Morningside, plans a brick and steel plant addition costing about \$850,000.

WEST LYNN, MASS.—General Electric Co., River Rd., Schenectady, N. Y., has let contract to Turner Construction, 420 Lexington Ave., New York, for a manufacturing building to cost about \$500,000.

MICHIGAN

ADRIAN, MICH.—Aget Mfg. Co., 1408 East Church St., has been incorporated with \$50,000 capital to manufacture metal products, by Harry L. Gilmore, 635 West Maumee St.

BATTLE CREEK, MICH.—A. B. Stove Division of Detroit Michigan Stove Co., 6900 East Jefferson Ave., Detroit, is having plans drawn by L. J. Sarvis, Battle Creek, for a plant addition costing about \$135,000.

DEARBORN, MICH.—Mohawk Metal Forming & Tool Corp., 1330 Industrial Ave., has been incorporated with \$55,000 capital to manufacture tools, jigs, dies and mechanical devices, by Jack Schmelz, Highland Park, Mich.

DETROIT—Budd Wheel Mfg. Co., 12141 Charlevoix Ave., plans a foundry plant addition, to cost about \$95,000.

DETROIT—Revere Products Inc., 9145 East Forest Ave., has been incorporated to manufacture gas burners and parts, with \$50,000 capital, by Roger H. Poirier, 9351 Elsa Ave.

DETROIT—General Instrument Corp. of Michigan, Dime Bldg., has been incorporated

with \$250,000 capital and 250 shares no par value to manufacture machines, tools and equipment, by George B. Mullin, 15848 Kentucky Ave.

DETROIT—Bower Roller Bearing Co., 3040 Hart Ave., has let contract to the Austin Co., 227 Curtis Bldg., for design and construction of plant additions, to cost about \$500,000.

DETROIT—Active Industries Inc., 888 Clairpointe, has been incorporated to manufacture farm equipment, by Henry Drettman, 706 Westchester, Grosse Pointe, Mich.

DETROIT—Autometric Tool & Mfg. Co. Inc., 10317 Northlawn Ave., has been incorporated with \$50,000 capital to manufacture tools, dies, jigs and fixtures, by Frank J. Jankiewicz, 8360 Almont St.

DETROIT—Industrial Engineering & Tool Co., 1520 David Stott Bldg., has been incorporated to manufacture electric motors and appliances, by Martin Silvers, same address.

DETROIT—Horvath Tool & Mfg. Co., 10210 Plymouth Rd., has been incorporated with \$50,000 capital to manufacture tungsten carbide tools, by Paul M. Horvath, 2135 Hubbard St.

DETROIT—Schultes Level Inc., 3377 Gratiot Ave., has been incorporated with \$50,000 capital to manufacture aluminum levels, by John Schultes, 564 Bellevue Ave.

DETROIT—Hawthorne Metal Products Co., 18350 Hawthorne St., is having plans made for a plant and office building, to cost about \$250,000. C. W. Brandt & Associates, 1413 Woodward Ave., Royal Oak, Mich., are architects.

FLINT, MICH.—Dew Mfg. Co., 1618 Industrial Ave., has been incorporated with \$50,000 capital and 50,000 shares no par value, to manufacture tools, dies and jigs, by Eldon A. Desermeau, same address.

FRASER, MICH.—Fraser Mfg. Co., 4996 Mulvey Rd., has been incorporated with \$30,000 capital to manufacture cast iron pulleys and rakes, by Paul C. Kuehn, Box 207, Fraser.

HAMTRAMCK, MICH.—Quick Tool & Gage Co., 12031 Mitchell St., has been incorporated with \$100,000 capital to manufacture tools, dies, jigs, fixtures and machinery, by Richard A. Connell Jr., Whittier Hotel, Detroit.

MISSOURI

ST. LOUIS—C. Hager & Son Hinge Mfg. Co., 2451 Dekalb St., has let contract to Fruin-Colnon Contracting Co., 1706 Olive St., for a one-story 150 x 290-foot plant building, to cost about \$100,000. Maura, Russel, Crowdell & Mullgadt, 721 Olive St., are architects.

ST. LOUIS—Monarch Weather Strip Co., 6333 Etzel Ave., has let contract to I. E. Millstone Construction Co., 4343 Clayton Ave., for a one-story 50 x 180-foot addition to weather strip manufacturing plant, to cost about \$55,000.

NEBRASKA

OMAHA, NEBR.—City has plans under way for a sewage disposal plant to cost about \$6 million.

NEW JERSEY

TRENTON, N. J.—Columbian Carbon Co., 601 Cass St., is having plans drawn for a four-story 112 x 159-foot plant addition, to cost about \$275,000. A. K. Bugbee & Co. Inc., Normal Ave. and Oakland St., is consulting engineer.

NEW YORK

HEMPSTEAD, N. Y.—General Bronze Corp., 34-19 Tenth St., Long Island City, N. Y., has plans for a plant to cost about \$2 million. S. L. Strauss, 70 East 45th St., New York, is architect.

WOODSIDE, N. Y.—Electrical Fittings Corp.,

30-45 Star Ave., Long Island City, N. Y., has plans for a factory building at Ave. and 56th St., to cost about \$125,000.

NORTH DAKOTA

DEVILS LAKE, N. DAK.—Otter Tail P. Co., Fergus Falls, Minn., plans expansion of power plant here at cost of about \$800,000.

OHIO

CLEVELAND—Glatther Lighting Co., East 72nd St., has been formed by Carl Glatther and will manufacture lighting fixtures as soon as equipment has been installed. A plant with 15,000 square feet floor space being available.

CLEVELAND—Neo Blast & Metallizing Co., has been formed to acquire assets of Neo Mold Co., 2160 East Eighteenth St. Equipment will be moved to a 50 x 100-foot building at 2181 East Eighteenth St. where blasting and metallizing will be done. R. J. Richards is president.

ELYRIA, O.—American Radiator & Standard Sanitary Co., Bessemer Bldg., Pittsburg, has plans for expansion of its steel furnace division, at cost of about \$250,000.

WILLOUGHBY, O.—Willoughby Machine Tool Co., Elm and Church Sts., plans a plant addition to cost about \$100,000.

OREGON

PORTLAND, OREG.—Willard Storage Bldg. Co. has let contract to Donald M. Dyer, for a 150 x 360-foot steel and concrete plant.

PENNSYLVANIA

PHILADELPHIA—American Oil Co., 1000 Ferry Ave., is having plans drawn for a bulk oil distribution terminal costing about \$500,000. G. Blatchley, American Branch, Baltimore, is engineer.

PITTSBURGH—American Cladmetals Co., Grant St., is having plans drawn for a story plant addition and alterations, to cost about \$1,200,000, with equipment.

READING, PA.—Parrish Pressed Steel Co., Weiser and Robeson Sts., is having plans drawn for a plant addition to cost about \$350,000.

SOUTH CAROLINA

GREENVILLE, S. C.—Mountain City Foundry & Machine Co. will build additions increasing capacity from 10,000 to 75,000 square feet floor space, at cost of about \$100,000.

TEXAS

CARROLTON, TEX.—National Metal Products Co., J. Curtis Sanford, Merchants Bldg., in charge, has plans for a plant costing \$225,000, rolling mill costing \$100,000 and tube mill costing \$125,000.

DALLAS, TEX.—Dallas Power & Light Co. plans installation of an additional turbine generator unit to double generating capacity of Mountain Creek Plant, at cost of about \$3 million.

FORT WORTH, TEX.—Tarrant County Water Control & Improvement district No. 5 has FWA funds for sewage treatment plant, to cost about \$125,000.

FORT ARTHUR, TEX.—U. S. Steel Products Co., Port Arthur, plans erection of a new building for manufacture of steel drums to cost about \$1 million.

WISCONSIN

WEST BEND, WIS.—Pick Industries Co., West Bend, has plans by R. H. Bier for 3402 West Thurston Ave., Milwaukee, a 130 x 150-foot foundry and a one-100 x 100-foot plant and warehouse.

WHITEWATER, WIS.—Whitewater Mfg. Co. has plans by A. Kuenzi, 202 North V St., Watertown, Wis., for a one-story 148-foot plant addition.